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TY-NINTH YEAR OF SERVICE TO THE METAL WORKING INDUSTRY

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MAY 1[illegible] 1934

THE IRON AGE

DUCTION -:- MANAGEMENT MAY 10, 1934 PROCESSES -:- NEWS

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THE IRON AGE, published every Thursday by the *IRON AGE PUBLISHING CO.* Publication Office: N. W. Cor. Chestnut & 56th Sts., Philadelphia, Pa. Executive Offices: 239 W. 39th St., New York, N. Y., U. S. A. Entered as second class matter at the Post Office at Philadelphia under Act of March 3, 1879. $6.00 a year in U. S., Canada $8.50, Foreign $12.00. Vol. 133, No. 19.

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THE IRON AGE PUBLISHING COMPANY

F. J. FRANK, *President* G. H. GRIFFITHS, *Secretary* C. S. BAUR, *General Advertising Manager*

PUBLICATION OFFICE: N. W. Corner Chestnut and 56th Sts., Philadelphia, Pa.

EXECUTIVE OFFICES: 239 West 39th St., New York, N. Y., U. S. A.

Member, Audit Bureau of Circulations
Member, Associated Business Papers

Published every Thursday. Subscription Price: United States and Possessions, Mexico, Cuba, $6.00; Canada, $8.50, including duty; Foreign $12.00 a year. Single Copy 25 Cents

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ADVERTISING STAFF

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MAY 10, 1934

ESTABLISHED 1855

Vol. 133, No. 19

Price Control Quicksands

PRICE control is a key part of "planned economy." Somebody has to do the job of setting prices when it is taken away from the patriarchal partnership of supply and demand.

The enthusiastic "open minds" of the New Deal, of course, recognized this fact but it did not daunt them. They put the Gold Dust Twins in the job to sweep prices up to 1926 levels with the devaluation broom. But that has not worked as per plan, and now there is serious talk of materializing the silver-hearted spirit of William J. Bryan to assist in the monetary price level control experiment.

Meanwhile a more specific and detailed, though limited, price control has been sought, particularly for "basic" industries and materials, by way of code provisions. This varies from complete allocation of production and absolute Governmental price dictation to simple agreement not to sell below cost.

As an emergency measure, there may be justification for attempts of this sort, just as a man pursued by a lion or bear would be justified in trying to run across quicksand as an alternative to being eaten.

BY this time doubtless even the most visionary planned economy advocates have realized the impossibility of effecting complete and detailed price control through all strata of business and industry. It is too complex a task for human ability to undertake, either for planning or enforcement.

So the alternative of the new dealers who still hug tightly the planned economy idea is to divide the price control job into two parts. "We," they say, "will manage the prices of basic industries and materials, and we will let supply and demand look after the rest."

They overlook the important fact that supply and demand have never consented to take a part time job and never will.

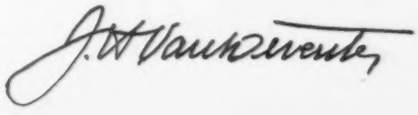
The higher up you go in the several successive strata of industry, the more diversification of products you find and also a higher proportion of the smaller sized units, the welfare of which it is NRA's expected intention to foster.

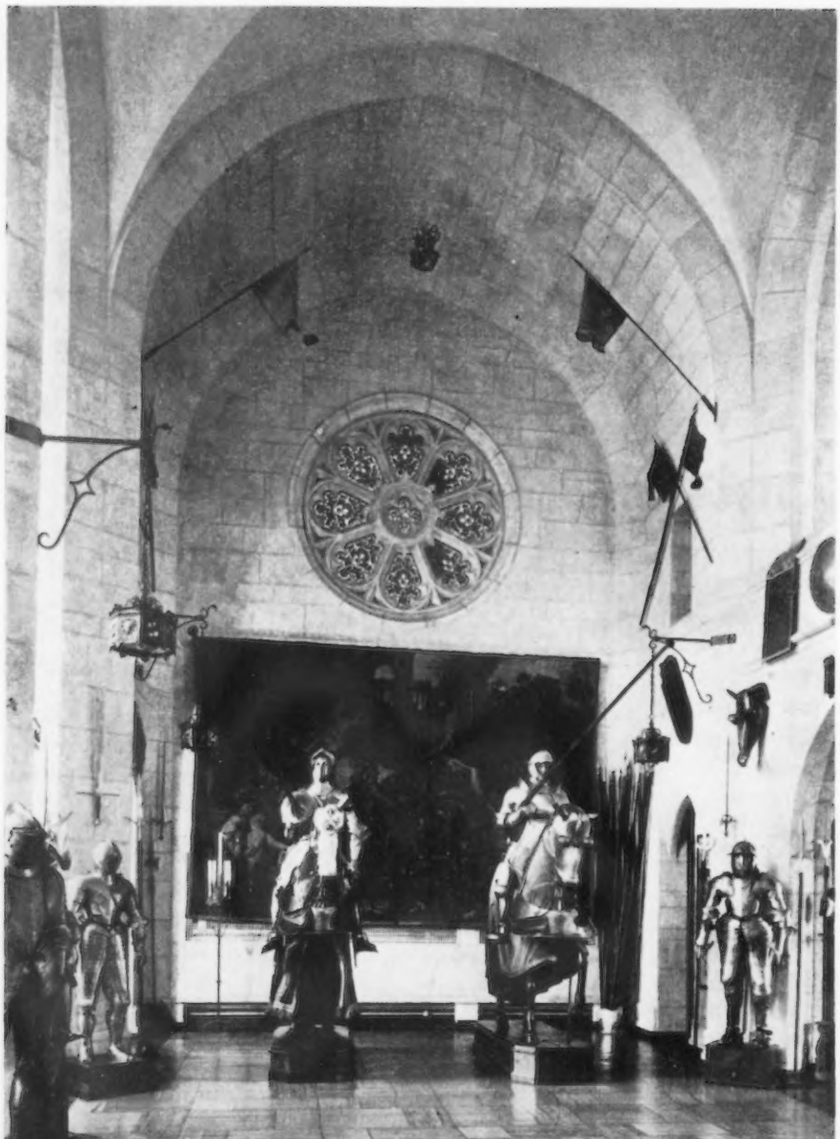
In the metal-working industry and particularly in its upper industry strata, a large proportion of the units are engaged in making "durable goods," for which there is now an inadequate demand and a "buyer's" market with its accompaniment of chiseling and cutthroat competition.

Thus we are faced with the anomaly of the lower strata of industries ostensibly protected against increased NRA costs by price control, whereas the upper strata industries, which buy from the lower strata, are vulnerable as to cost and unprotected as to price.

WHAT is the solution? We don't know. But we do know that basic industries, however protected, cannot prosper unless their customers do.

This business of price control seems to be a matter of "whole hog or none." You cannot step a little way into the quicksand of price control without danger of being swallowed bodily by state socialism.





The illustrations in this article show portions of the John Woodward Higgins Armory, Worcester, which was established by the author and contains exhibits that trace the influence of the manual arts on the working of iron and steel through the ages to the present day. For centuries the evolution of the working of iron and steel was chiefly in the development of arms and armor, and hence these form conspicuous parts of the collection. The contrast between the old and the new is brought out sharply by the mounted knights which dominate the nave shown above and the chassis of a high-power automobile which dominates one of the naves shown in the following pages.

Manual

WHY do agitators rail against the machine as a Frankenstein monster—accountable for the depression?

The economic salvation of America lies in the manufacture of superior machinery for the world. Superior machines can be created only by superior manual dexterity. Here is the challenge. The operation of machines for the mass production of consumer goods is simply a means to an end, but not an important factor in the evolution of our civilization.

This is Mr. Higgins' philosophy of the modern American machine.

Editor.

OUR National Recovery Codes prohibit the employment, in gainful occupations, of youths under 16 years of age and the wage and hour restrictions bar from industry all apprentices and incompetent workers—even the part time, "continuation" school pupils. Proposed Federal child control legislation would extend this ban to 18 years and establish a National Commission to proscribe other activities of youths. Finally, under a smoke screen of economy, proposed State legislation would withdraw teaching of manual training and household crafts from public schools, after a notably successful record of 40 years.

Such measures for curtailing and controlling the supply of skilled craftsmen—a selfish and stultifying objective in itself—forebode national evils more serious than any industrial abuses they purport to eliminate, unless adequate substitutes are provided. Are we not convinced after 15 years of painful experience that extreme prohibition laws defeat themselves? Modern youth demands admissions and deserves more and broader opportunities for self-expression, not less. When we outlaw a supposed evil, should we not be clever enough to substitute counter attractions? Must we revert to creeds and codes?

Massachusetts was an industrial

Dexterity and Machine Art

By JOHN W. HIGGINS
President, The Worcester Pressed Steel Company, Worcester, Massachusetts

JOHN W. HIGGINS

State and her pioneers expressed intelligent appreciation of industry. But the village blacksmith and the carpenter shop have disappeared—even the workbench in the cellar, where a boy could make his own dog house, had to give way to household luxury, when the coal bin was replaced by an automatic "conditioner" and the basement transformed into a luxurious card-room dominated by a modernistic chrome-plated bar for the new dispensation of private tastes.

Manual dexterity and ingenuity manifest themselves early, but if neglected and ignored during the adolescent period while puzzles, games, and schools are all emphasizing quick-wittedness, static knowledge, and classics, how can America expect to develop an art craftsmanship rivaling, for example, that of Japan or Italy in the 16th century?

The "overprivileged" boy goes away to "prep" school and college with his radio, tea set, and lounge pillows. What chance has he to acquire personal efficiency and manual dexterity? Educators rail against parents who route all their boys promiscuously into overcrowded colleges, but what alternatives are advertised? College life with its sports, songs, and good fellowship is played up to every family. Compare the melodramatic Hollywood films with the educational and craft films they see. Naturally these "college boys" are superior material for industrial managers, but they start heavily handicapped alongside the trade-school boys. No wonder that their untrained stiffened fingers develop an "inferiority complex" long before their dormant capacity and inherent ingenuity are awakened.

College graduates turn to soliciting insurance because they never experienced the joy of craftsmanship and construction. Those students who incline toward a business career expect to tutor at a post-graduate lecture course, with occasional visits to large manufacturers. Even our surgeons and dentists, whose success depends more upon manual dexterity than on Greek derivatives, rely upon post-graduate laboratory practice, after their fingers have attained adult stiffness—or upon practice on their patients—before they conclude that they are ill adapted for these professions. We favor *young* surgeons because they know the latest methods, but *old* surgeons because they have acquired greater skill through practice—what a paradox! Youthful, nimble fingers should yield the greater skill if they begin early and are guided wisely. The surgeon we would choose for our operation is the young expert trained early to manual dexterity, other things being equal.

We are complacently substituting machines for "child labor" and "sweat shop" labor, knowing that the peasants of "backward" countries where these abuses have thrived for generations exhibit the greatest manual dexterity. Educators and psychologists agree that manual work, wisely selected, develops imagination, originality, confidence, expression, and intelligence—as well as culture and artistic appreciation—all essential qualities for improving this good world of ours. Courses for teaching manual dexterity to these boys and girls who also have the means, opportunity, and ambition to continue still higher scholastic training will expand their cultural and artistic capacity—as well as their creative skill. Some preparatory schools are providing courses in the manual arts but no credits are allowed for proficiency.

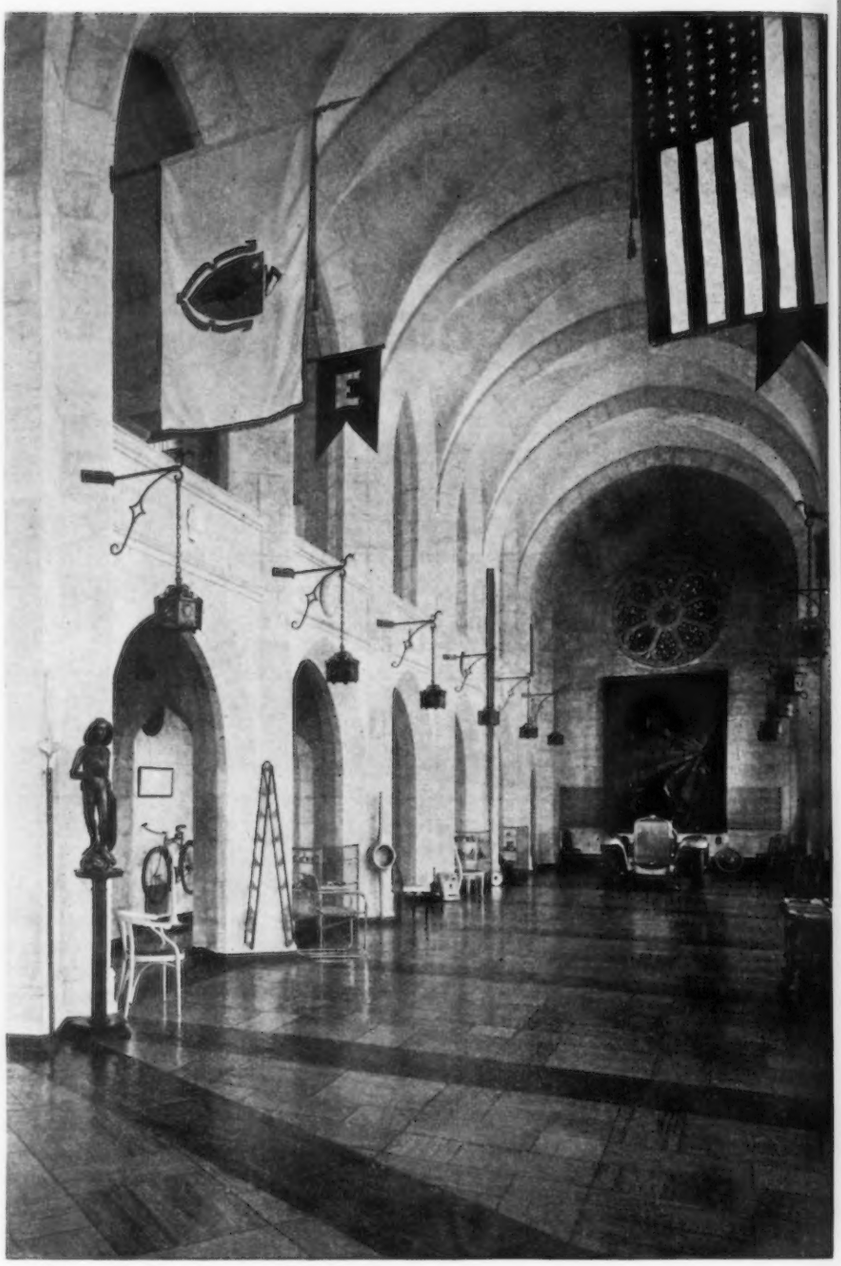
Intelligence is capacity filled with reason. Capacity expands only by *doing things* and reasoning power avails nothing until it is trained for use; consequently educators and statesmen, a generation ago, recognizing the necessity of developing the creative faculty, established public school courses in manual training, vocational instruction, and occupational therapy (under shorter names) along with the 3 R's, since the craft

guild and apprenticeship system was being crowded out of manufactories by specialization and efficiency methods. When *we* were dropped from school or graduated from university, the business world wanted us; but *now* supply has overwhelmed demand. Technocrats say that we have overproduced both commodities and children; so today we have turned to wits, I.Q's, rackets, and synthetic dexterity and are finding very few constructive opportunities for using them. Graduates are not now wanted—they have to choose between post-graduate courses and loafing with an "inferiority complex" and unless our overcrowded trade schools are expanded, thousands of adolescents will continue majoring in coeducational banditry. Occupational opportunities are as essential as bread lines and doles, but only wealthy youths are now able to keep occupied. The public school system will have to take over all craft training.

In our early youth we passed many after-school hours in a carpenter shop making "jimcracks." The jig saw and the glue pot were favorite tools for creating designs. We felt the thrill of confidence that comes from constructing with our own hands something useful and in our judgment beautiful. Later came bicycle and "horseless carriage" adjustments in the machine shop, and that manufacturing atmosphere stirred our mechanical imagination with ambition. The Mechanics Association sponsored coeducational vacation classes where cabinet work, pattern making, and wood carving were taught, prior to "prep school" days. Few such incentives are now available to our sons with their predigested, automatic toys and fool proof automobiles.

Since the first paleolithic sculptor chipped extra flints, a million years ago, to trade for his neighbor's extra canoe, youth has grown up into business, teeming with creative accomplishment—"helping big men do real things." It took five hundred thousand years to learn to polish those chipped flints, but since then intelligence and industry have advanced through manual dexterity in geometric progression. Let us beware how we upset this "apple cart" with inhibitions. Of course, business must serve man, and adolescent youth must be protected from exploitation, but general prohibition will shunt that spark of genius into destructive circuits, unless we restore natural opportunities for expression in craftsmanship and household occupations, as well as sport and recreation.

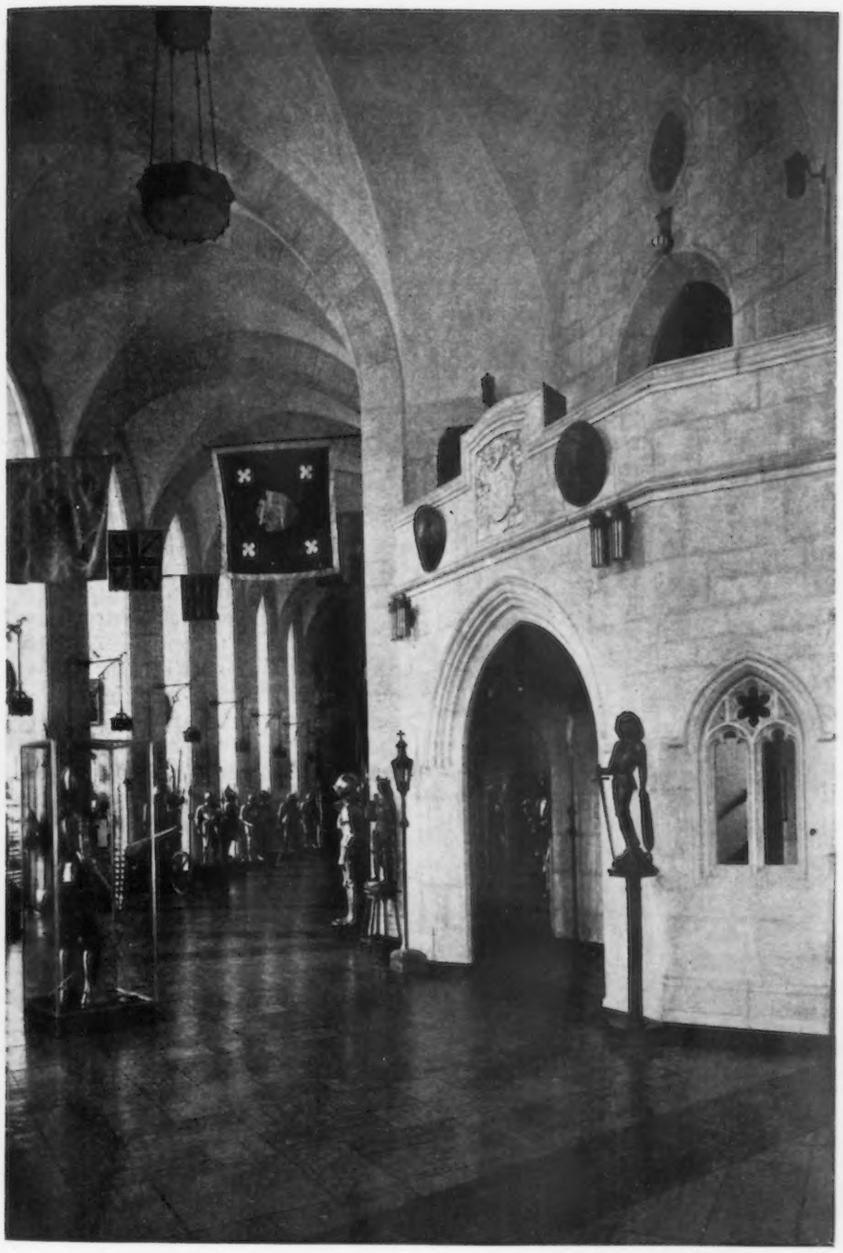
Even children perceive that daily chores are now performed more easily



and quickly by machinery than by hand, and naturally they reason, "Since efficiency is the goal of our scientific age, why should we bother with hand work?" They overlook the fundamental fact that the perfection of these machines is due to the coordinated skill of the hands of trained engineers. Machines never produce better work than the hands of their masters. Machines cannot put art into an object; only hands and hearts can do that. The great masters in their own day were inspired by the incentive of supreme craftsmanship and needed no conviction that they were creating works of art for all time.

If the day comes when hand-made masterpieces pall beside machine-made products, then our modern machine-made civilization passes its zenith and forthwith degenerates. These fine machines will wear out and join the file of other "lost arts." New machines made by old machines and used by unskilled operators will deteriorate in all respects; masters will quit creating great art expressions and will lose their ability to create greater machines for turning out better products. Here is the vicious circle. When we neglect craft training, we relinquish our vision of art as well as of science. Artists, craftsmen, and engineers who cannot produce superior hand products will never make machines that excel.

Whenever you fail to detect superiority in handiwork and prefer machine quality, either you lack comprehension



of the art or the craftsmen lacked skill and inspiration. Do not scorn your wife's good judgment if she chooses to pay $25 for a hand-made handkerchief in Venice, when you buy machine-made rayon here for 25 cents that looks better to you. Her very perception and desire (even if you cannot afford to satisfy it) will raise the quality of machine-made 25 cent handkerchiefs. Do not let her lose that vision—it is worth satisfying at much sacrifice. The chances are that her own needle skill is proportionately developed, and skill may be applied to sewing on a suspender button. Consumer-demand denotes a community's culture more truly than intelligence quotients, and you can judge a city by its stores as well as by its schools, churches, and art museums. Supply-and-demand must give and take, but both are cultivated together. That Italian hand-made lace was designed and woven by peasants, eight year old children to 80 year old grandparents, all working under what we call "child labor" and "sweat shop" conditions, from dawn till dark —but they produced masterpieces. Our machines will not even approach that quality without great sacrifice and the application of that same grade of devotion and manual dexterity to the development of our machine art. Synthetic silk and "cultivated" pearls do not compare with nature's product, for time is of no consideration to a worm or an oyster. But time and cost are the elements which justify the machine—not laziness, slack standards, and lost skill.

Observe the debacle the Russians are making of our machines, bought with their precious hand-earned money. They noticed our wheels and concluded that these were the secret of our prosperity, but they soon discovered that machines without their master's hand would never save their five-year plan. Some of our own legislators and "brain trusters" still have this lesson to learn. The cultured Chinese have praying machines, artistic but ineffective; these do not bring food nor peace to suffering China. America advances with efficient mechanization. We champion mass production by super machines, *ad infinitum*, but we must recognize that the best machine is only an amplified tool in the hands of its master. *Manual Dexterity* is the prerequisite. Next in importance comes the better machine—as an end. We may stress quantity production, but solely as a means to this end. All other arts will take care of themselves unless we wreck the Robot possessing the golden touch.

We shall live to see the machine advance in power, speed, efficiency, and quality, but bunglers will never build machines which transcend their own mediocrity. Super achievements in any art break from the top of the craft, and only the hand is virile. Always the hand is supreme, because it is the mind's best tool.

Machines are humanitarian. They only crowd out the stagnant laborers. The intelligent workers in the long run are boosted into better jobs—with a head start—making, improving, and maintaining better machines. Whenever one machine forces temporary unemployment or offers permanent leisure, others offer the means of profiting by it and enjoying it. Machines never held down a good man—nor a better machine. They tempt craftsmen superior to their original creators; their success depends on the morale of their friends. They are never the self-creating, maintaining and perpetuating organisms of evil that some social reformers and professional agitators would have us believe. Ruskin railed against the repetitive handwork of his day because it made machine-like slaves out of workers; he branded the buyers of hand-made glass beads as slave-drivers. Philosophers now welcome modern machines because they release men from machine-like labor—they allow the masters to devote all their attention to inventing, designing and developing better machines for doing all such repetitive drudgery. No longer does anyone condemn and try to destroy those Arkwright looms.

(Continued on page 80)

Finishing Stellite Valve Seats for

By FRED B. JACOBS

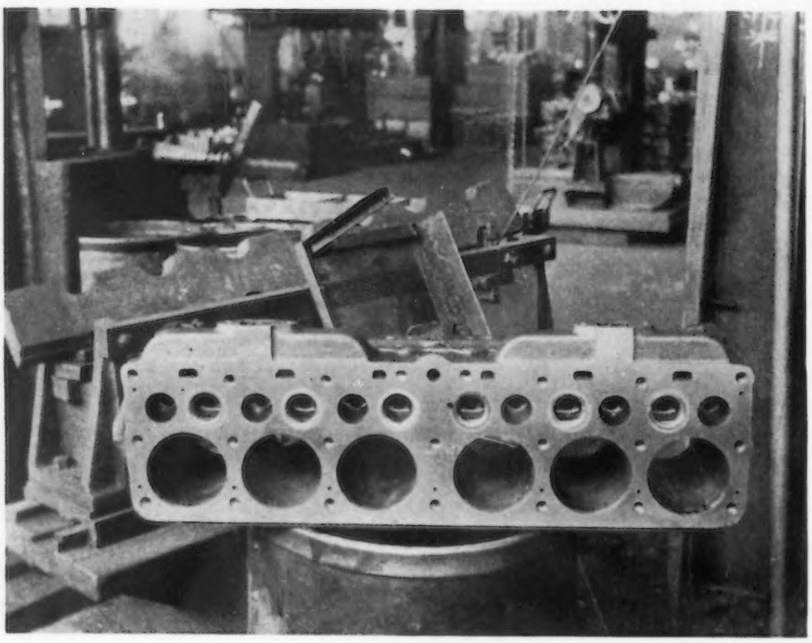


Fig. 2. Cylinder block, showing exhaust valve seats inserted.

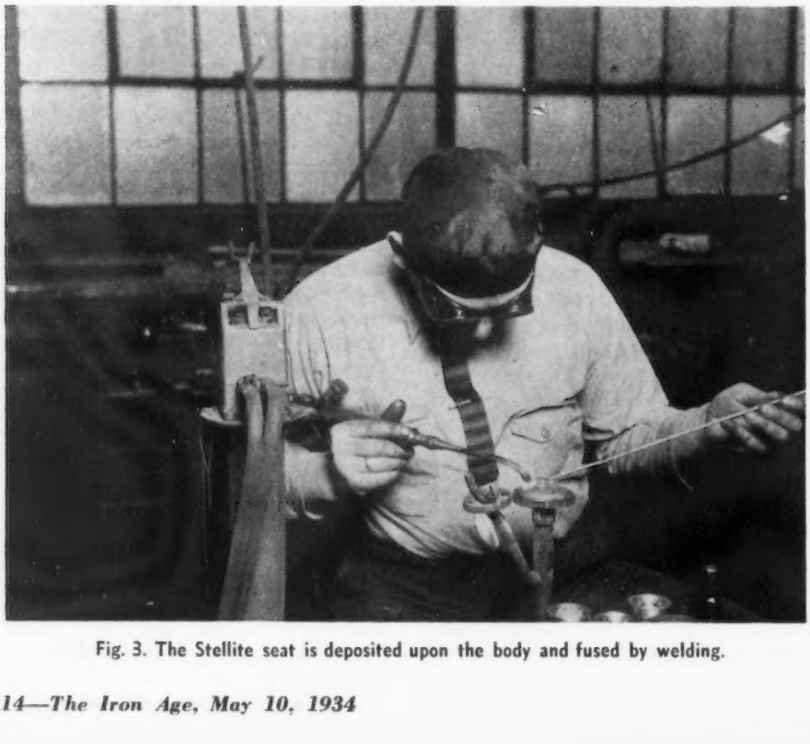


Fig. 3. The Stellite seat is deposited upon the body and fused by welding.

OVER forty years ago when the automotive industry was a weak and struggling infant and showed little hopes of developing to its gigantic importance of today, engineers adopted any practical means to accomplish a desired result. Thus poppet valves were employed because they were easy to construct. These early valves were not efficient as they burned out rapidly and broke frequently. The gradual development of the alloy steels and the art of heat treatment solved this problem satisfactorily, and such valves working in cast iron seats machined directly into the cylinder block or cylinder head have been standard for some thirty-five years or more. While efficient valves have been made for many years, it is only within the last few years, comparatively speaking, that serious attention has been given to the valve seats.

To machine the seat directly into the cast iron head or cylinder block is a cheap and simple procedure, but such valve seats always have caused more or less trouble with exhaust valves. When the valve stem sticks, the hot burning gas "wire draws" through the slight opening between the valve and its seat and this causes rapid erosion. The difficulty has been overcome by the introduction of special inserted valve seats of hard, unburnable material for the truck and bus motors built by the White Motor Co., Cleveland, Ohio, and this article illustrates and describes briefly the interesting grinding operations followed in finishing the valve seats.

In Fig. 1 is shown the valve seat in section, the construction details of which are quite simple. The seat proper is screwed into the cylinder block against a thin, soft steel gasket while the method of locking the seat in place is shown clearly. This construction is used for the exhaust valves only, as shown in the illustration of the cylinder block in Fig. 2.

The valve seat body is a machine steel annular member formed on an

White Motors

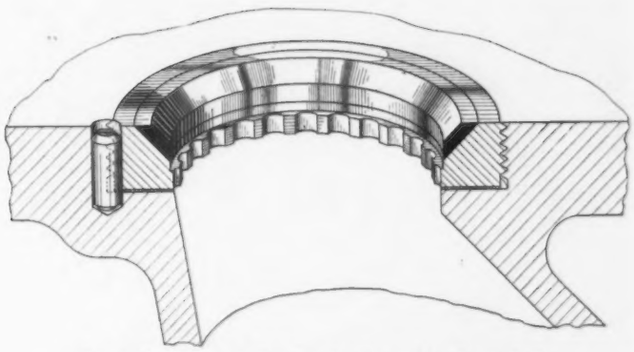


Fig. 1. Construction diagram showing seat and seat body.

THE familiar slogan, "Ask Dad, he knows," might well be applied to the troubles encountered by motorists of the earlier days when exhaust valve seats were machined directly in the cylinder block. Today, inserted valve seats of hard, unburnable material are being used, with considerable elimination of burned valves and "wire drawing."

Stellite seat inserts are used for the exhaust valves of White motors. In this article the author describes the interesting operations in making and machining these seats.

automatic lathe, which operation is simple and commonly understood and thus calls for no particular comment. The seat itself is Stellite No. 1 which is fused in place by the oxyacetylene process. This operation is shown in Fig. 3. The operator inserts a copper plug or filler into the seat, this member acting as a mold. The Stellite is fused into the space between this filler and the valve seat. The top of the seat thus formed by welding is rough and uneven so that a disk grinding operation follows to bring the Stellite insert approximately level with the seat body. A careful visual inspection follows the disk grinding operation and any seats that are not fused in place properly are rejected before any subsequent operations are performed.

Rough grinding of the taper seat follows. This operation is performed in a Brown & Sharpe universal grinding machine adapted for the purpose. The work is held in a three jaw chuck rotated by the headstock which is set to generate the necessary angle. The wheel is Alundum, 1½ in. in diameter, 1¼ in. face, 50 grit, N grade, and is run at a speed of 5000 r.p.m. While the surface speed of this wheel is of course comparatively slow, it has been found to give excellent results in this case.

Referring again to Fig. 1, it is shown that the valve seat is counterbored above the serrations. Grinding of this counterbored diameter is the next operation which is done in a Bryant grinder. The setup is shown in Fig. 4. Here the work is held in a three-jaw collet chuck, the jaws being provided with shoulders at the back so that the work can be chucked accurately. The wheel used for this job is Alundum, 1½ in. in diameter, ¼ in. face, 50 grit, N grade, operated at a spindle speed of 5000 r.p.m. This operation smooths up the Stellite and the soft steel seat to the correct inside diameter.

The serrations on the inside of the seat are now broached. While the object of these serrations is to afford means for screwing the finished seat in place, they also are used as a locating point in subsequent operations. Thus they must be broached with an accurate tool. The seats are broached one at a time in a special fixture, care being exercised to test each seat after broaching. A special plug gage is used to make sure that the diameter is correct. The operations performed before broaching might be called roughing operations, but the broaching and the operations that follow constitute finishing processes.

It is of course essential that the tops and bottoms of the seats be flat and true and this is accomplished by Blanchard grinding. This machine carries an Alundum cylinder wheel 18 in. in diameter, 5 in. face, 1¼ in. wall, 46 grit, G grade, silicate bond. This wheel is mounted on a vertical spindle and runs at a speed of 860 r.p.m. The work is mounted on a rotary magnetic chuck which has a speed of approximately 15 r.p.m. In this operation the chuck face is loaded to a reasonable capacity, about 100 parts at one setting. One side is ground true and flat, then the parts are

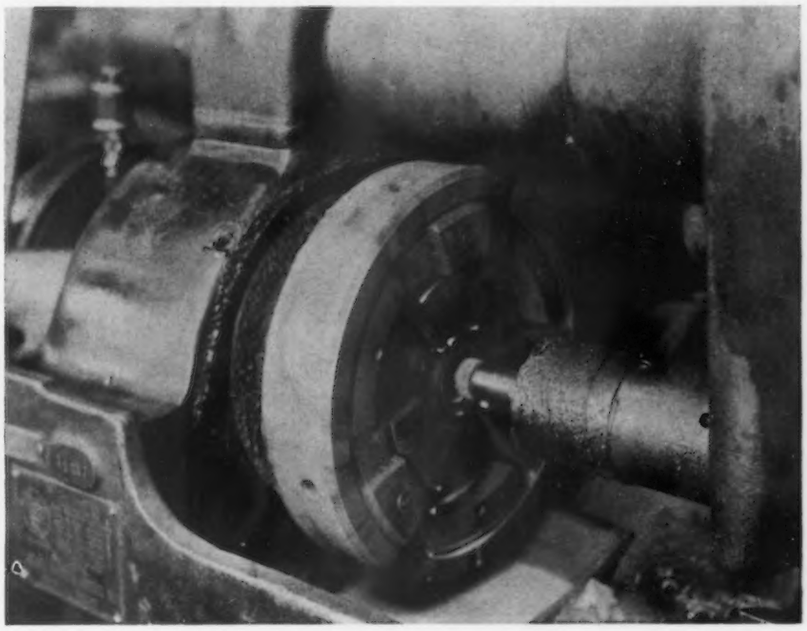


Fig. 4. Grinding the counterbored diameter.

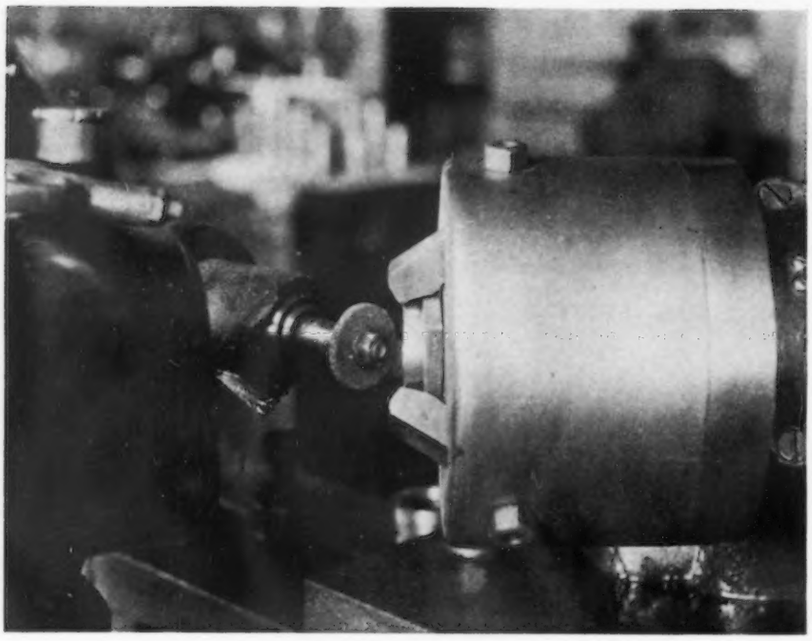


Fig. 5. Finish grinding the tapered seat.

turned over and the other side finished. This is strictly a precision grinding operation and the finished seats must be true within very close limits, less than 0.0001 in.

The next operation consists of turning the outside diameter and finishing the undercut at the bottom slightly below the root diameter of the thread which is cut later. Fig. 1 shows this undercut plainly. In turning the outside diameter the seat is held on a special arbor and the work located from the serrations. As this is an ordinary engine lathe job it requires no special comment aside from the fact that the arbor on which the work is mounted must run dead true. Otherwise the seats would be eccentric and this would cause trouble later. However, if the arbor is tested occasionally and care is exercised in the operation the finished work will be concentric as to the outer diameter and serrations, which is the condition sought.

The operation next following consists of finish grinding the seat. This is an important job and the ground seat must be exactly concentric with the serrations. The setup for this is shown in Fig. 5. Locating from the serrated work seat, the valve seat is held against the grinding machine chuck face by three jaws which operate simultaneously. As Fig. 5 shows, the chuck is set at an angle with the grinding wheel to generate the desired bevel to the seat. This machine is a Brown & Sharpe universal grinder, while the wheel is Alundum, 1½ in. in diameter, ¼ in. face, 50 grit, N grade, operated at a spindle speed of 6000 r.p.m.

Cutting the threads that screw the seat in place constitutes the next operation. It is obvious in referring to Fig. 1 that these threads must be accurate and concentric with the valve face. The required accuracy is assured by milling the threads as shown in Fig. 6. This machine is a semi-automatic Hanson & Whitney thread miller. The valve seats are located four at a time on a special arbor in a series of two seats each placed back to back. The arbor is held between centers and rotated by two jaws as the illustration shows. The hob that does the milling is of course a very accurate tool with its threads finished by grinding. As the hob rotates at a speed of approximately 200 r.p.m., the work advances at the necessary lead. After the cut is complete the hob moves away from the work automatically and returns to the starting position as shown in Fig. 6.

The foregoing constitute the principal manufacturing operations on the valve seats. In assembling the seats in the cylinder block, the block is bored and counterbored under a heavy duty drilling machine after which a hand operated facing tool is used for the final finishing to bring the seat to the desired squareness and depth. Then in large blocks or heads holes are drilled and tapped for the locking screws as shown in Fig. 1. Pins take the place of these screws in smaller cylinder blocks. After the valves are ground in place in their seats the operation is complete.

If it ever should be necessary to remove a seat, this can be accomplished readily by taking out the locking screws or pins and screwing the seat out from its position. However, as the seat is practically indestructible there is little or no cause for removing it. Instances are on record wherein valves sticking, the valve heads have been completely burned away while the seats were not injured. Thus once the seats are set in place they should outwear the rest of the motor.

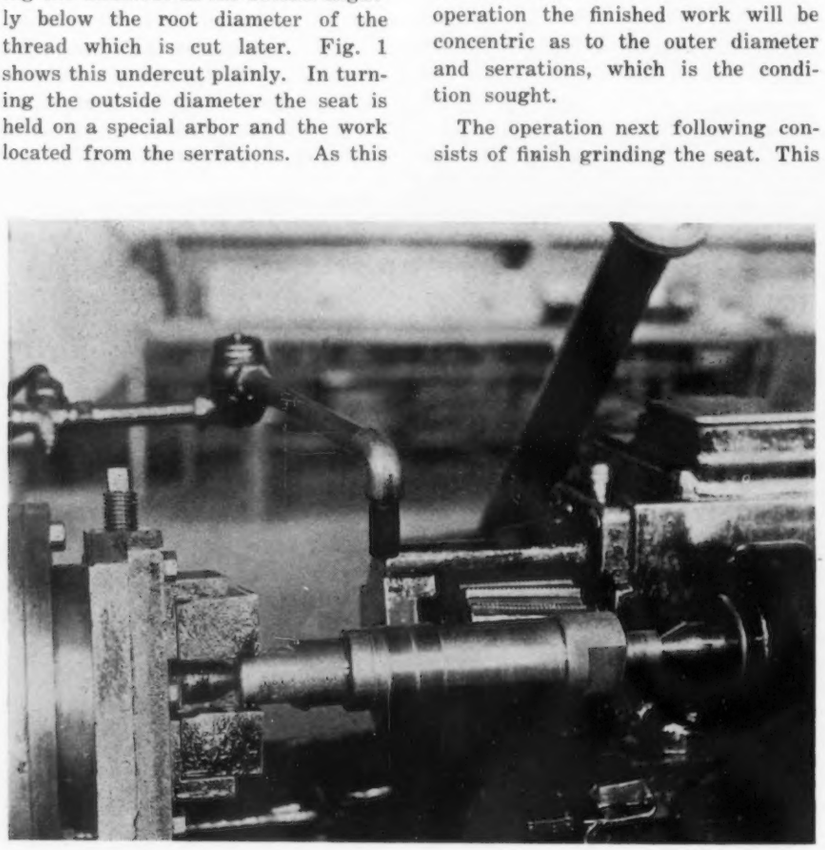


Fig. 6. Milling the seat's thread.

Attractive Finish Helps Metal Products Sales

17—Pre-Finished Raw Materials

By HERBERT R. SIMONDS

OBVIOUSLY, one way to overcome high finishing costs is not to finish. This is accomplished by some manufacturers without sacrificing appearance through the use of pre-finished raw materials. Plated and polished strip is made into such items as lamp reflectors and loose-leaf binders, and lacquered sheets in decorative design are made into vanity cases without the necessity of any finishing at the fabricator's plants.

Some features of the production and use of pre-finished materials are described in this, the seventeenth article in a comprehensive series on metal finishing.

PROGRESS in the development of labor-saving machinery has been so great during the last decade that it has temporarily blinded industrialists to some opportunities for lowering production costs in other channels.

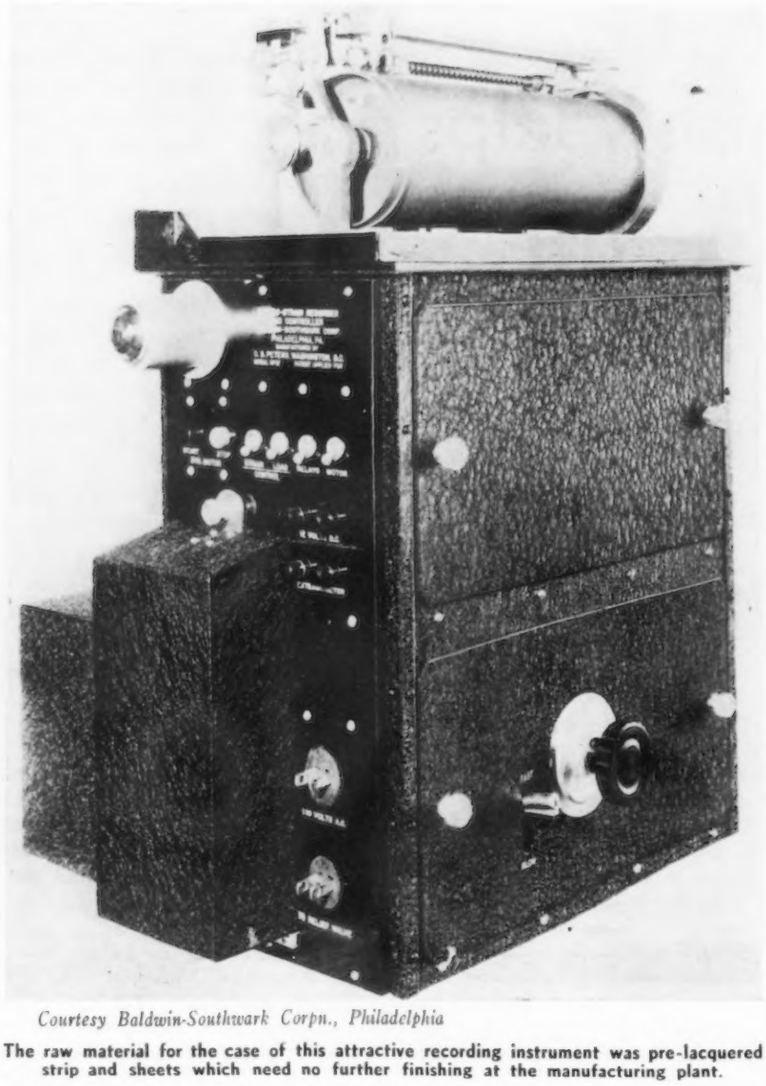
One such opportunity lies in the field of metal finishing. Over and over again in this series, examples have been given where the weak link in a manufacturing chain existed in a cleaning or finishing process.

The very nature of finishing operations, coming as they do at the end of the production sequence, offers a handicap to their organization and to high quantity output. An assembled unit cannot be handled as efficiently as can the simpler parts from which it is composed.

Thus it is apparent that the further back the finishing process is, in the over-all manufacturing sequence, the greater is the chance of putting it on a low unit cost basis, and it is this factor which has stimulated the recent trend toward plating and polishing of sheet and strip metal at the producing mills. Several other factors contribute to this trend, of which the most important, perhaps, is the development of forming and pressing technique which makes it possible to fabricate parts from the high polished material without scratching the surface.

"Large-scale standardized production of plated and polished sheets makes for economy not possible in the manufacturer's plating department," according to James Mee of the American Nickeloid Co., Peru, Ill., who continues, "The use of pre-finished sheets or strip of this character is almost invariably less expensive than the cost of maintaining a plating department, if capital investment, depreciation, and cost of materials are properly considered. In the case of pre-finished chromium plated

Tops for washing machines are stamped and formed out of plated and polished sheets without the necessity of further polishing after fabrication. This shows parts in process at a large washing machine plant. The pre-finished sheet was supplied by the Apollo Metal Works, La Salle, Ill.



Courtesy Baldwin-Southwark Corpn., Philadelphia

The raw material for the case of this attractive recording instrument was pre-lacquered strip and sheets which need no further finishing at the manufacturing plant.

sheets, the economy is especially pronounced because it eliminates hand-racking of individual parts, which is a slow, expensive operation."

Of course there are some articles which cannot be fabricated advisedly from the high polished sheets, but in most cases an adaptation of the processing and assembling operations will make it possible to use the pre-finished sheets for at least some of the component parts of a product. The other parts can then be plated and polished before assembling in the company's own finishing department.

Where the surfaces are irregular it is often difficult to remove buff marks when plating and buffing succeed fabrication. This difficulty may be overcome in a large percentage of cases by using sheets that are plated and finished in the raw state before fabrication. In addition to this, Mr. Mee points out that the large-scale standardized methods of finishing sheets at the mill make it possible to produce a surface superior to that obtained by plating and finishing small individual items.

Polished Sheets Easily Handled

Much of the reluctance to use highly polished sheets in fabricating processes comes through lack of experience or ignorance of the possibilities. In Mr. Mee's opinion, "With relatively few exceptions, polished sheets are as easily and successfully handled through processing operations as are the unfinished sheets. Chrome plated copper, for instance, is not harder to work than bare copper, and nickel tin is as easily drawn and formed as tin plate."

Certain precautions, of course, are necessary in handling polished surfaces. Dies must be kept in better shape than when used on plain material and they must be properly designed. In forming with a sheet metal brake, the metal should be greased on the finished side and the paper in which the polished sheets are packed should be used to line the brake.

Where it is desired to solder finished sheets, chrome plated, for example, the chrome surface should be removed from the sheets and a non-corroding solder paste should be used. For small parts, a hand file will remove the plate, and experience will indicate the amount of surface to be removed. Before soldering the complete joint, Mr. Mee advises "solder tacking" at several points to keep the parts lined up.

New Designs Are Needed

In many cases it is possible to so design a product that the soldered joint will be concealed by a cover piece. However, further designing ingenuity, combined with the excellence of the pre-finished sheets now available, often makes a soldered or welded joint unnecessary. Mill polished sheets can be spot welded and even deeply drawn, and many surprising examples of high luster finish are to be found today among articles fabricated from such sheets without subsequent finishing. One manufacturer of tableware is successfully producing highly polished products from pre-finished sheets, without doing any polishing or buffing at his own plant, except on his dies, which he takes great care in keeping in perfect condition and which are all chromium plated and polished to eliminate even tiny scratches.

Pre-finished sheets aid in mass production processes, as otherwise high-speed presses and forming tools are slowed down by the relatively slow operations of plating and polishing. Some of the products now successfully made on a production basis from polished sheets are loose-leaf notebook parts, name plates, collapsible tube clips, boxes, novelties, toys, trunk hardware and brush ferrules. Larger articles include table tops, refrigerator trim, electric stoves, office machines, window trim and other decorative building materials and washing machines.

Mass Production Finishing

Several strip and sheet producers who have taken up finishing of their materials in earnest have developed elaborate automatic, and, in many cases, continuous finishing processes. At the plant of the Apollo Metal Works at La Salle, Ill., for instance, cold-rolled strip is given a polished chromium finish in one continuous operation. The strip enters the process in its natural state, and the sequence includes washing, acid treatment, copper plating, nickel plating,

chromium plating, polishing, buffing, paper coating and coiling, all automatic and all continuous.

At the far end, the coils, averaging about 100 lb. in weight, are boxed and are then ready for shipment. The paper which has been introduced to protect the buffed finish is a special paper developed for this particular purpose, with a soft surface on one side. It is purchased in rolls having widths corresponding to the widths of the strip being finished.

Sheets are of course more difficult to handle, but even here very nearly automatic finishing has been achieved, and, in addition, the wide strip now available in long coils takes care of a large percentage of the average run of small metal products.

Pre-Lacquering Has Advantages

Lacquering and painting of sheets is an important part of the general pre-finishing of raw materials, and at least one company has developed a lacquer which is hard, yet elastic enough to be used on coiled strip and even under moderate drawing dies. A flexible, transparent lacquer for copper strip has just been announced by the Copper and Brass Research Association.

The lacquering machine illustrated with this article is automatic except for loading, and applies a uniform coat on sheets up to 60 in. wide. Many machines of this character contain drying units which complete the lacquering processes in one operation.

Sheet Metal Products

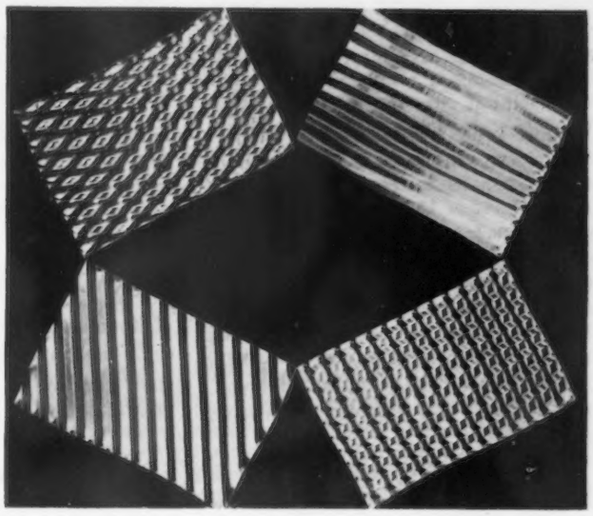
Sheet metal is making a strong bid for business in many fields formerly occupied by cardboard, wood and other non-metallic materials. One of the most interesting examples of the inroads being made by sheet metal is found in the packing field. Here it may be said that success is dependent upon the use of pre-finished raw materials, as otherwise the required low costs could not be met in combination with high appearance value.

One of the companies to take an active interest in the use of metal for packaging is the Apollo Metal Works. This company makes a specialty of a light-weight chromium plated steel sheet which may be formed into all manner of attractive boxes without the necessity of finishing on the part of the fabricator. Boxes made of this material have a surprising permanence and are used for packing pen and pencil sets, playing cards, shaving brushes and many toilet articles.

The versatility of this particular metal was shown some time ago in a production of The Vanities in New York, for one scene of which the entire scenery and bakground were made of Apollo chromium plated metal. This same metal in strip form is used for the edges and trim of cardboard boxes, to give an added decorative effect as well as an increased strength. An example of this is a florist's box now being used by some leading florists. Even crackers are being sold in boxes of which chromium finished sheets form a substantial part.

Ford Uses Chromium Plated Copper

The decorative effect of polished sheet metal is becoming more and more apparent. Show windows, exhibit booths, and, in some cases, per-



Sheets and strip are now available in a great variety of decorative finishes. This shows several forms of crimped sheets as produced by the American Nickeloid Co.

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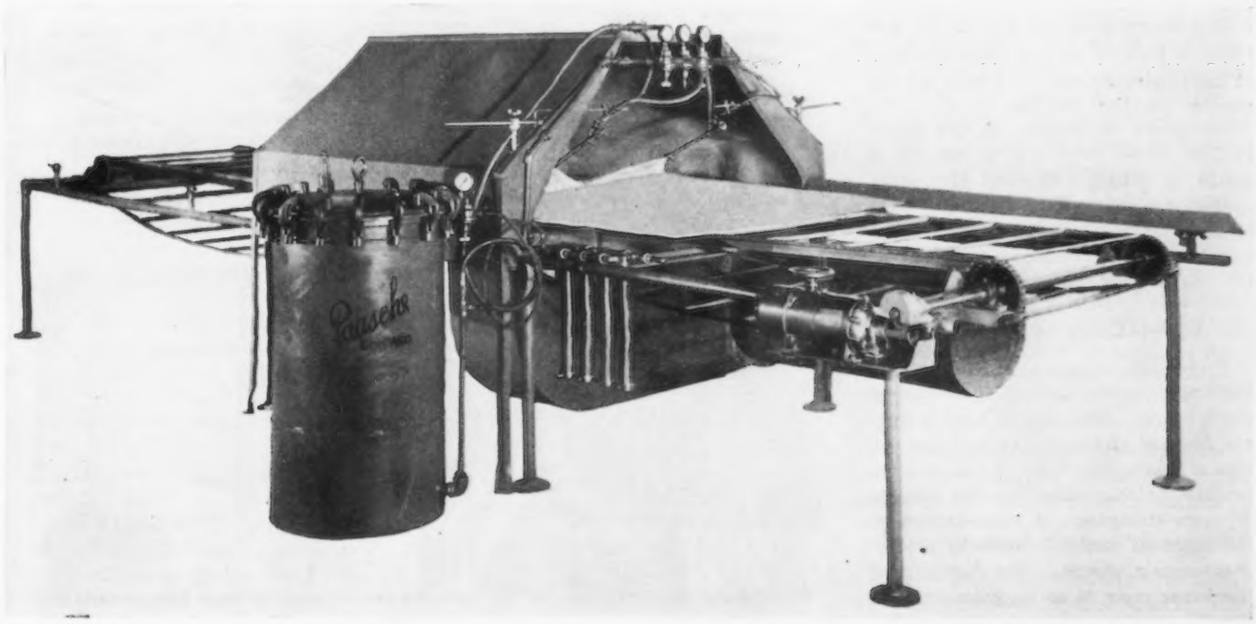
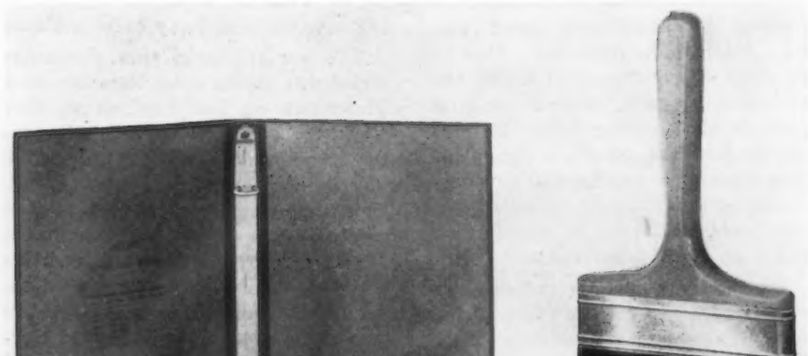
High production lacquering and painting of large sheets is accomplished on automatic machines of this type.

Courtesy Paasche Airbrush Co., Chicago





All the metal parts used in the manufacture of some styles of loose-leaf note books are formed from plated and polished raw material, and the ferrules on painters' brushes come in strips which not only are polished at the mill but are also ribbed for decorative effect.

manent wall coverings are being made of chromium steel sheets. The Ford Motor Co. will use more than 20,000 lb. of chromium plated copper in its new exhibit at the 1934 Chicago World's Fair. The Citizens Conservation Corps camps in one order purchased small mirrors which were stamped out of 15,000 lb. of chromium plated sheet. The Dennison Mfg. Co. orders chromium plated strip in carload lots for making rims for its familiar cardboard tags. Some other familiar uses of chromium plated steel and copper are auto mirrors, jewelry case rims, towel cabinets, letter signs and tops of cardboard powder boxes.

One of the newest developments in the use of pre-finished sheets is for roadside signboards. Instead of buying plain sheets and having workmen on a scaffold paint the entire surface with a background for the design, the sheet is painted in any color desired, at the producing mill, and then all the painter on the job has to do is to superimpose his design. A new effect in this same field makes use of a matte or brushed finished aluminum surface for the background. The sign is then painted directly on this, leaving the bare aluminum surface for the sky or the background.

Vanity Cases at Low Cost

Attractive compact boxes are ingeniously made out of pre-finished sheet metal. One design uses a mirror finished chromium copper for the inside stamping and a decorative lacquer finished steel for the outside or cover stamping. A cross-section of this type of box is shown in an accompanying sketch. The forming of the inner piece is so ingeniously done that the surface which becomes the mirror is left undisturbed. The outer piece is either in a plain color or may be made with a design, in which case the sheets are purchased covered with a series of circular designs each intended as the top piece to one box. Assembly of the two parts is by spinning or turning the edge of the inner part over the cover, leaving a small rim of chromium plate surrounding the lacquer design.

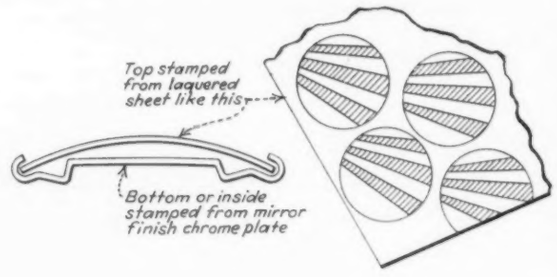
Extension of Pre-Finishing Expected

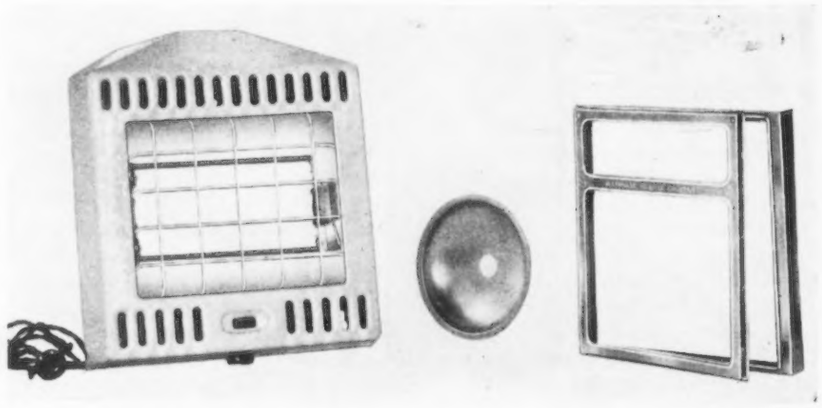
A pre-finishing of raw materials is not limited to flat-rolled products. Polished drill rod has been familiar in industry for a quarter of a century, but now plated and highly polished wire in coils is finding many new uses, one of which is for the rings of loose-leaf note books.

Nevertheless, pre-finishing in general is still in its infancy and extensive development in this field may be expected in the near future. As the possibilities of the new hard finish lacquers become better known, lightweight angles, channels and plates may be available in colors as the raw materials for manufacturers of farm equipment, sleds, baby carriages and similar items. The bicycle manufacturers may be able to buy pre-enamel tubing for frames, just as the maker of bicycle wheels can now buy polished strip for making his rims. Some features of enameling and lacquering metal will be described in future articles in this series.

The Apollo Metal Works recently developed pre-finished tin plate which consists of tin plated sheets surfaced with electro deposited finishes of popular metals and polished to a high luster. Sheets of this character find usefulness in many cases where an added appearance value is desired. The company calls attention to the fact that this material should not be used where heat is in excess of 500 deg. F. Some of the parts made from chrome-finished tin plate, known as Apollo Chrometin, are mouth organs, musical instruments, decorative trays, oil cans, wastepaper baskets, kitchen accessories, hub caps and display devices.

Typical design of vanity case lid made of two stampings, one with a lacquer finish and the other with a mirror finish.





Reflectors for electric heaters, and the frames for cracker boxes are made from polished sheet.

Selection of Steels for Plant Applications

THE selection of a proper steel as part of a product, as a tool for making the product or for plant maintenance, has a very definite bearing on the commercial success of the product. A rightly functioning purchasing department must be able to correctly specify steels for given purposes, and the steels received should be thoroughly checked in order to insure that the original specifications were observed. Brand names appeal to the aesthetic sense of many buyers, and the steels they thus select may be intrinsically good but unsuited to the purpose for which they were purchased. In order to facilitate a purchasing agent's choice of material, Mr. Allen has concisely assembled the data contained herein which cover all the usual requirements of large and small industrial concerns. This paper was presented on May 4 at a State College, Pa., conference.

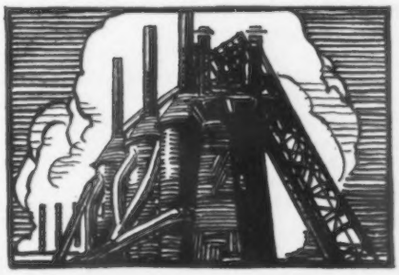
By FRANK J. ALLEN
Engineer, York Ice Machinery Corpn.

MOST companies which have grown beyond the personal management stage of their founders have efficient and sometimes elaborate purchasing departments, but these departments are often their only contact with the suppliers of their purchased needs. This condition applies to all purchased materials, although herein it is of particular interest to study its effects in the buying of steel.

A condition quite common to find is that a purchasing department may have to depend on several individuals for guidance on steel purchases. These individuals are often engaged in other organization and production functions, and the specification of steels, if their recommendations can be so dignified, is of a secondary nature. In many cases the purchasing department follows the policy of buying only the best. If buying the best always meant buying the most suitable there would be little fault to be found, but it often happens that the best is often not the most desirable. In other cases the selection is left to the supplier, but not all suppliers are equipped to correctly advise purchasers and some advise from a personal viewpoint.

In all cases there should be a close technical contact with makers and sellers of steel, although a purchasing department, engrossed as it is in dealings in dollars and deliveries, is often not the right point for such contact. However, in order to simplify the specification of steels for particular purposes, a fundamental consideration of the more common problems is given herein.

Steel specifications should be held as simple as possible in order not to unnecessarily restrict the field of supply. Where it is possible, the standard specifications of national technical societies and like bodies, such as the S.A.E. and A.S.T.M., should be utilized. Such specifications give a very wide range and are available from a wide field of supply. Sometimes, however, special requirements may render such a procedure impossible, but for general shop purposes this would be a rarity.



In all cases it is advisable to remember that a tool or machine part should be just good enough for the job, as it is poor engineering to build a strength into a part which won't be called upon by the nature of its operation. A guide in the study of specifications should include (1) what are the ideal qualities of a steel to do the job, (2) is such a steel available in the open market, and (3) what would be the result of using an available but less ideal steel? Steel requirements may be roughly divided into two main classes which are (1) machinery steels used for machine parts, and (2) tool steels used to make a machine part or sometimes as the part itself. The qualities needed may be possessed by a plain carbon steel, may be produced therein by heat treatment, by additions of alloying elements or by both of these methods.

Importance of Carbon Content

For a reasoned selection of steel, the significance of the presence or ab-

TABLE I

Chromium Content	Carbon	Property of Steel
½ per cent		Deep uniform hardness.
2 to 3 per cent	1.5 per cent	Bearing steels, moderate wear resistance.
3 to 4 per cent	0.90 per cent	Hot working die steels, permanent magnets.
12 to 16 per cent	0.05 to 0.70 per cent	Stainless steels.
10 to 20 per cent	1.5 to 2.5 per cent	Cold drawing dies. Very great wear resistance.

sence of the various elements in the steel must be understood. All steels contain carbon, and there is always present sulphur and phosphorus as impurities. The manganese and silicon which are always present function as deoxidizers.

Of all the possible elements present in steel, carbon exerts about the greatest influence. Its presence is greater or lesser degree will cause considerable variance in the physical properties of the steel, and its reaction to heat treatment is usually greater than that of any other element present. Therefore the prime importance of the carbon content is basic to any study of steel. For each 0.1 per cent of carbon added to naturally cooled steel up to 0.9 per cent, the physicals are affected approximately as follows: Tensile strength is increased 9300 lb. per sq. in., yield point is increased 3900 lb. per sq. in., elongation is reduced 4.50 per cent, and reduction of area is reduced 7.25 per cent.

Above 1.00 per cent of carbon the brittleness of steel increases rapidly and its use is confined to parts requiring high hardness and little toughness as in tools. Further increases in the properties just noted are of course obtained by heat treatment.

Sulphur in steel causes "red shortness" or brittleness in rolling or forging. Its presence makes a free cutting steel.

Manganese adds to the tensile strength and acts as a cleansing agent. It counteracts the sulphur by formation of manganese sulphide in place of iron sulphide, which has a lower melting point. This acts to cure the red shortness of the steel.

Silicon increases the tensile strength and yield point of the steel, but does not materially impair the ductility.

Phosphorus causes brittleness or cold hardness. Small percentages increase the tensile strength and hardness of steel. In the carbon steels there is covered in either the A.S.T.M. or the S.A.E. specifications an available wide choice. The physical characteristics cover a broad range and the tensile strength in the as rolled, as cast or in the heat treated condition may be from 50,000 to 200,000 lb. per sq. in. Similarily, the yield point may range from 25,000 to 180,000 lb. per sq. in.

The carbon steels satisfy a large proportion of the demand for readily machinable steel for high production work. Bessemer screw stock is no doubt the most suitable steel where free cutting is the criterion, but its indifferent physical qualities are often a disadvantage. Where ductility and homogeneity are needed it is often substituted by some other steel. The open-hearth screw stock grade as covered by the S.A.E. specification 1120, while providing more reliable physicals, loses considerable in the easy machining qualities. However the high manganese, high sulphur and low carbon type steels as represented by S.A.E. No. X1315 provide both reliability of physicals and ease of machining.

If Bessemer screw stock be regarded for free cutting as 100 per cent, the following arrangement of steels may be made in the order of machinability.

(1) Bessemer screw stock.
(2) Hi. Mn., Hi. S., Low carbon.
(3) Open-hearth screw stock.

TABLE II

Specified S.A.E. No.	Possible Substitution S.A.E. No.
3120	2315, 2320, 3115, 6120, Hi manganese screw stock
3135	2335, 2340, 3130, 3140, 6130, 6140
2315	2320, 3115, 3120, 6120, Hi manganese screw stock
2330	2335, 2340, 3130, 3140, 6130, 6135
2350	2340, 3140, 6140
6120	2320, 3120, Hi manganese screw stock
6140	2340, 2350, 3135, 3140, 6135
Hi manganese screw stock	2320, 3120, 6120

The low carbon steels do not respond to heat treatment with the exception of carburizing, and the regular screw stock grades are unsuitable for this purpose owing to a high sulphur content. A simple steel for carburizing is S.A.E. 1020, although it has bad cutting qualities when compared with some other types. Here again the high manganese, high sulphur and low carbon type enters in as it will carburize to the same case depth in 20 per cent less time than the S.A.E. 1020 type. Also the case will be more uniform and the core tougher, which gives the finished piece longer life. Production may be increased in the heat treating of quantities by the time saving, or if lower temperatures with the same time as for the S.A.E. 1020 grade are used a saving would result in maintenance of carburizing pots and furnaces.

A very great number and variety of machine parts are made from medium carbon range steels, and if given proper thought a still greater use could be made of it. By medium is meant from 0.25 to 0.55 per cent carbon. The parts for which these steels are used usually have definite physical requirements. The S.A.E. steels No. 1030 to No. 1045 have proved their value in this class.

Steels with a carbon content of from 0.20 per cent to 0.30 per cent when heat treated are not affected in physical properties except to toughen. Their tensile strength will range from 65,000 to 90,000 lb. per sq. in. In comparison, a steel with a carbon content above 0.35 per cent readily responds to heat treatment. These steels are not easily machined, although the use of a machine part may render ready machinability of less importance than in the case of the low carbon group. Here again the manganese steels will help out, as the high manganese, high sulphur, medium carbon group will provide a type giving relatively higher physicals, more uniform response to heat treatment and much greater machinability. Where there is a production demand for parts of higher quality, this type should be considered.

The above mention of manganese steels among the straight carbon group came from their frequent advantageous substitution for carbon steels at so little above carbon steel first cost. More specific mention may be made of them here. It used to be thought that 1 to 3 per cent manganese in carbon steel of up to 0.50 per cent carbon caused brittleness in the steel. This in spite of the fact that 1.5 to 2 per cent manganese was used in producing non-shrinking, oil

TABLE III

S.A.E. Steel or Equivalent	Tensile Strength, Lb. per Sq. In.	Yield Point, Lb. per Sq. In.	Elongation in 2 In.	Reduction in Area	Machinability	Uses
Flange quality steel plate A.S.T.M. Spec.	55,000 to 65,000	25,000 to 30,000	0.25 per cent (in 8 in.)		poor	Plate sprockets, rings, and disks; various shapes not made in quantity but cut out with torch.
S.A.E. 1112 and 1120	.....	.....	.....	.....	excellent	Screw machine products may be surface hardened but not carburized. Lightly stressed parts.
			Per Cent	Per Cent		
X 1315	65,000 to 75,000	35,000 to 45,000	30 to 35	50 to 60	excellent	Screw machine products to be carburized. Small forgings, bolts, levers, brackets, carburized sprockets, pinions, and rollers. Parts where strength is not paramount.
S.A.E. 1020	50,000 to 60,000	30,000 to 35,000	25 to 35	45 to 60	poor	As for X 1315, but lacks machineability. Good carburizing grade.
S.A.E. 1035	70,000 to 80,000	40,000 to 50,000	18 to 28	35 to 45	good	Responds to heat treatment for higher physicals. Machined parts and forgings requiring fair strength. Heavy duty shafts. Crank pins, piston rods, gears.
X 1350	90,000 to 110,000	55,000 to 60,000	20 to 30	35 to 45	good	As for S.A.E. 1035 but for more severe service. Better machining and response to heat treatment.
S.A.E. 6120	125,000 to 135,000	115,000 to 125,000	18 to 22	60 to 65	fair	Carburizing stock for severe wear and shock resistance.
S.A.E. 6140	145,000 to 160,000	120,000 to 135,000	15 to 20	40 to 50	fair	High shock and fatigue resistance. Uniform response to heat treatment. Highly stressed machine parts. Constant-mesh gears, worms, screws. Heavy duty gears and shaftings. Cams, cam rollers.

quenching tool steels. Now there are produced a range of manganese machine steels, the low carbon type analyzing C 0.10 to 0.20, Mn 1.25 to 1.55, P 0.045 maximum, S 0.08 to 0.13, and with increasing carbon content and varying manganese to C 0.55 to 0.60, Mn 0.90 to 1.20, P 0.04 maximum, and S 0.055 maximum.

Influence of Manganese

The low carbon type of steel meets the demand for a free cutting material capable of being carburized and free from inherent brittleness. Sulphur in steel has been regarded as a necessary evil. However not only does the resulting manganese sulphide from the manganese present act to prevent red shortness in rolling but is a definite aid to machinability. Manganese tool steels are of the non-deforming type, and this property, which is contributed by the manganese, is a valuable feature in the low carbon manganese screw stock type of steel. This steel has found favor for carburized parts of delicate section as the warping in the quench is reduced to a minimum. Steels having a manganese content of from 2 to 7 per cent are very special in their nature, and the manganese range from 8 to 13 per cent comprise products known as Hadfield's manganese steels. The principal value of the latter steels is in their resistance to wear under heavy pressure and severe abrasive conditions. The steel work hardens under cold working more than any other steel. Where the work is *purely* abrasive and there is little or no cold working, the steel loses this advantage. These steels due to their work hardening property are commercially unmachinable, and, therefore, they must be ground.

Nickel combines with iron in all proportions, and the resulting alloys have a great variety of useful properties and applications. There is a pearlitic, martensitic and austenitic series of nickel steels, and of these the pearlitic type is the more important commercially because of its adaptability to ordinary shop practices. For tool steels the use of plain nickel steels is limited, but nickel is advantageously used with other alloys in steel. Less than 3 per cent nickel does not improve the physicals of a steel in a worthwhile manner unless other alloys are present, whereas nickel above 5 per cent gives a steel difficult to work and unless the carbon is low it tends to the martensitic. In the pearlitic steels, that is where the nickel does not exceed 5 per cent, the nickel increases the hardness, tensile strength, and the elastic limit without impairing the ductility. In the as rolled condition, the effect of the presence of nickel can be noted without special heat treatment in the increase of the tensile strength and the elastic limit. Hence the use of nickel steels for large parts which cannot be heat treated easily. In heat treatment a milder quench may be used to produce a hardness obtainable only with a severe quench on a carbon steel having equal carbon content. This lower temperature reduces quenching strains and distortion, and there is an increase in depth of hardening in the quench. With their lower critical range, the nickel steels are annealed or hardened from a lower temperature than the carbon steels of equal carbon.

TABLE IV

S.A.E. Steel	Per Cent Machinability
S.A.E. 1112	100
X1315	85
1120	80
X1350	75
6140 annealed	65
4130 annealed	65
2330 annealed	65
1040	60
1035	60
1020	60
6120	60
2345 annealed	60
3115	55
2315	55

A readily available series of nickel steels is the S.A.E. 3.5 per cent nickel group. S.A.E. No. 2315 is primarily a carburizing steel as the nickel retards carbon absorption during carburizing. Both case and core are toughened by the restriction of grain due to the presence of the nickel. Steel No. 2330 is most widely used where great strength and toughness are required, and steel No. 2350 has a field of service for large gears subjected to severe service.

Chromium stands second in extensive use as an alloying agent. It finds

its widest application in conjunction with nickel or vanadium. Chromium has a great affinity for carbon, and the formation of chromium carbide in steel proceeds until all available carbon is used and only then does it go into solid solution in the ferrite of the steel. The hardness of chromium steel is partly due to this formation of chromium and chromium-iron carbides. The hardness obtained does not affect the toughness produced by the grain refining tendency of the chromium. Chromium lowers the thermal conductivity of the steel; thus it is important that heat be applied gradually in treatment to avoid setting up internal stresses, due to unequal thermal expansions, which might crack or deform the piece. Equally outstanding with the uniform hardness and depth of penetration of heat treatment caused by chromium's presence is the effect of chromium on the magnetic properties and corrosion resistance of the steel. The variation of steel properties with carbon and chromium contents is shown in Table 1.

Vanadium is one of the most powerful of alloying elements, and, consequently, it is usually used in smaller quantities than any of the other elements. Like chromium, it has maximum influence when present with some other alloying element. Straight vanadium structural steels contain as little as 0.15 to 0.20 per cent, while in tool and high-speed steels the vanadium content may reach 2½ per cent. Vanadium intensifies the effects of heat treatment and its real worth is found in a heat treated part. For a given tensile strength the vanadium steels are more readily machinable than other alloy steels, and certain machining operations may be performed after heat treatment. The most important industrial application of vanadium is in chrome-vanadium steels which are used in a great variety of ways for parts subject to severe service. They have excellent strength, toughness, resistance to wear and fatigue, and their machining and welding properties are good.

For various applications the necessary different characteristics are obtained by varying the carbon content. Generally the chromium is held at 0.80 to 1.10 per cent and the vanadium at 0.15 minimum with about 0.18 desired. For parts requiring a very hard surface and subjected to shock the S.A.E. steel 6120 carburized has proved of value as the hard case and exceedingly tough core which are developed give the needed combination for shock and wear resistance. S.A.E. 6150 can be used over a wide field for machine parts which perform severe services. In the heat treated condition the tensile strength will run from 120,000 to 140,000 lb. per sq. in., and the yield point from 105,000 to 125,000 lb. per sq. in. In this condition it is machinable, and parts of shape difficult to heat treat uniformly may be subsequently produced from a heat treated bar or block. Without developing extreme hardness this steel has a very high resistance to wear and fatigue. This chrome-vanadium type has a naturally dense, homogeneous structure which develops a work hardened case in service without a change of dimensions. This case results in a wear resisting quality equal in many cases to a file hard part. There is a very deep and uniform penetration of heat during treatment, and chrome-vanadium steels in varying carbon content find many uses as tools.

Uses of Ni-Cr Steels

The nickel-chrome steels resemble the chrome-vanadium series in many ways, yet they have important differences. They are used for structural parts requiring great strength and toughness, but have little application as tool steels. The nickel and chromium are used in structural steels in varying amounts, but as a general rule the Ni content is about two to three times that of Cr. The carbon does not often exceed 0.50 per cent. In nickel-chrome steels the Ni and Cr each contribute their individual characteristics and tend to minimize each other's disadvantages. The Ni toughens while the Cr increases the hardness, and the Cr tends to raise the critical while the Ni tends to lower it. The drag tendency in machining of annealed nickel steels is somewhat offset by the presence of the chromium. S.A.E. 3120 is a case hardening steel which will develop the maximum core strength obtainable with the nickel-chrome steels, and it can be used where medium depth of case is satisfactory. For axles, shafts, and other heavy duties the S.A.E. steel 3135 contributes strength, toughness, and fair machinability. The increased carbon of the S.A.E. 3140 makes it susceptible to deeper penetration of the heat treatment, and it is mostly used for parts having heavy sections.

Tungsten is one of the earliest elements used in alloying steel. It finds practically no use in structural steels since in the absence of a high carbon content moderate quantities of tungsten have only a very slight effect on mechanical properties. Tungsten is used in a great number of tool steels including high speed steel, and in parts required to resist high temperatures. Tungsten increases the hardness of a steel, is a grain refiner, and has marked effects on magnetic properties.

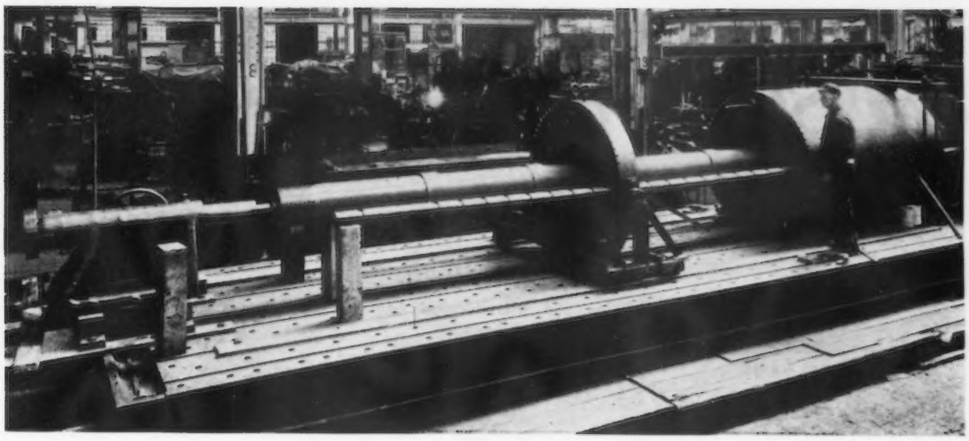
Molybdenum resembles in some ways tungsten and in some ways vanadium in its effect on steel. It is used in moderate percentages in tool steels and magnet steels, and still more in structural steels where in small percentages together with chromium the product resembles the chrome-vanadium type. When present in small percentages, molybdenum increases the elastic limit and shock resistance, and in the higher range of hardness it is easier to machine in a heat treated condition than other alloy steels of equal strength. The air hardening properties imparted to steel by molybdenum make it particularly valuable in the tool steel field.

It must be clearly remembered in selecting an alloy steel that the physical properties of the steel in the heat treated condition must determine its use, and any advantage of the untreated alloy steel over the carbon steel is insufficient to warrant its

(Concluded on Page 74)

TABLE V

Type	Uses
Die Steel	
Carbon steel C 0.80 to 0.90.	For toughness and hardness. Chisels, punches, shear blades and spring steel.
Carbon steel C 1.00 to 1.10.	Where hardness is the chief requirement. For dies where first cost is important. Long life not essential.
Manganese oil hardening, non-shrink type.	Dies not too complicated. Wear resistance needed.
Hi carbon, Hi chrome, oil quenching.	Dies of intricate shape.
Cobalt, Hi carbon, Hi chrome air quenching.	Dies of intricate section; danger of cracking in the quench.
Chrome-vanadium type.	For dies subjected to heavy shocks.
Cutting Tools	
Carbon type.	Moderate service. Finishing cuts.
High speed. 18-4-1.	Heavy service. Good life between grinds. Tools should be well backed up.
High speed. Cobalt type.	Very severe service. Great wear and heat resistance. Tool must be well backed up.
3-5 per cent tungsten type.	Finishing cuts of high degree.



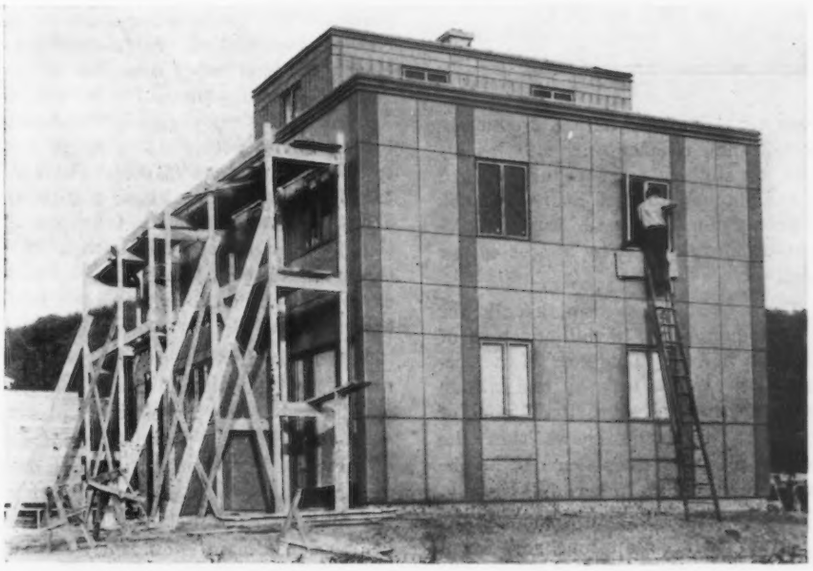
Assembling a Large Rotor

ASSEMBLING the rotor for the Philadelphia Electric Co.'s new 183,333 kva. turbine generator requires extreme precision in placing each plate so that four 6-in. diameter bolts, with a clearance of 0.006 in., may be assembled by hand. The illustration shows a plate being drawn over the huge center bolt into position on a hydraulic press in the East Pittsburgh shops of the Westinghouse Electric & Mfg. Co.

The center bolt, weighing nearly 6 tons, is 13 in. in diameter, 310 in. long, and is forged from nickel-molybdenum steel. It is believed to be the largest bolt of its kind ever made. The temporary bolts at the side are part of the hydraulic press for drawing the plates to position. The guide pins, seen in the top and bottom holes in the last plate, index each plate in position. After the plates are in position, four 6-in. bolts will be pushed in by hand. Perfect position is necessary to allow the bolts to pass through, because there is less than 0.006 in. clearance. These bolts will hold the plates between two heavy forgings. A hydraulic bolt puller, exerting 1,500,000 lb. pull and stretching the bolts ⅜ in., will be used to turn on each nut by hand. Steam will be passed through a hole in the center bolt, heating it to about the same elongation until its nut is in position.

This unit will be installed at the Philadelphia company's Richmond generating plant, Philadelphia, and will be ready for commercial service late in 1935.

Sheet Steel House Nearing Completion At Wheeling, W. Va.



FRAMELESS and constructed largely of sheet steel, the experimental house being built at Wheeling, W. Va., by the Wheeling Corrugating Co. is nearing completion and will shortly be thrown open to the public for inspection. As described in detail in THE IRON AGE, July 27, 1933, page 29, the floor decks, ready for a surface of hardwood, were completed when the sheet steel combination of stud and deck, combined in one piece, was welded together. The flooring system is said to be the strongest ever devised and produces a load carrying capacity 40 per cent above that ordinarily required for residence construction. The same type of floor in heavier weights will probably be brought out for industrial and other buildings capable of increasing resistance to deflection under vastly greater loads while rendering full fire protection to structure and contents above.

Present Status of the Soviet Iron and St

By M. N. JURIN
Mining and Metallurgical Engineer
Los Angeles

THE vast expansion of the Russian iron and steel industry, proposed by the first and second five-year plans, is a part of the general program for the industrialization of the Soviet Union. All industries embraced by the plan are closely interdependent, and the iron and steel industry, as a backbone of modern industrial production, is of fundamental importance. The failure in the iron and steel sector will necessarily result in the failure of the rest of the plan.

The demand for steel in the years to come on the Soviet market is even likely to exceed its planned production. In fact, the iron and steel output of the Soviet plants has been lagging behind the demand for steel by railroads, and by tractor, automobile and machine building industries. The giant tractor plants, such as Stalingrad, Charkoff and Cheliabinsk, are gradually increasing their output and have reached about one-half of their designed annual production of 190,000 tractors. The mass production of Soviet automobiles also has started in a big way with the completion of the Gorky (Nijny Novgorod) plant with its designed output of 140,000 cars annually. The facilities of this plant it is proposed to expand so it will be able to produce as much as 300,000 cars a year. There are also smaller automobile plants in Moscow, Yaroslav and other cities.

It is planned to build during the next five years 79 regional electrical power stations in the Soviet Union, which will require a large amount of steel tonnage in the form of power machinery, structural steel and so on. The Soviet railroad program calls for electrification of 5000 kilometers of railroad lines, the substitution by heavy rails of the light ones on 20,000 kilometers of tracks, 9500 kilometers of rails for double tracking and so on. It is also planned to increase the number of locomotives from 19,500 in 1932 to 24,600 in 1937; the number of railroad freight cars from 552,000 in 1932 to 803,000 in 1937.

The Planned Output of Pig Iron

It was proposed by the first five-year plan to raise the production of pig iron from 3.3 millions tons in 1928 to 10 millions tons in 1932. As a result of the overconfidence which swept the Soviet State Planning Office after the inauguration of the plan, the goal of the plan was raised subsequently from 10 millions to 17 millions tons. But the actual production in 1932 had reached only 6.2 millions tons, or slightly more than one-third of the planned output. Still this mark of production exceeds the Russian prerevolutionary output by almost 40 per cent.

THE conclusions of the accompanying discussion of the present conditions of the steel plants of Soviet Russia are based on a study of material printed in the Soviet publications. The author is a graduate of the Mining Institute of St. Petersburg (Leningrad) and was employed by the Russian Railway Commission, New York, as a chief inspecting engineer on rail orders placed in the United States in 1915 to 1917.

The second five-year plan calls for the production of 18 millions tons of pig iron in 1937. This goal of the second plan exceeds only by one million tons the upwardly "revised" goal of the first plan and shows that the Soviet planning men learned to be more conservative. There is a reasonable assurance that this aim of the program will be approached, if not reached. A great construction activity in the metallurgical field of the Soviet Union is going on now. It is planned to put into operation in the current year 13 new blast furnaces, 40 open-hearth furnaces, and 28 rolling mills (3 blooming mills in that number). The planned production for this year is set at 10 millions tons of pig iron, 9.8 millions tons of steel and about 7 millions tons of rolled steel. Recently the 109th blast furnace of the Soviet Union was blown in at the Kouznetsky plant.

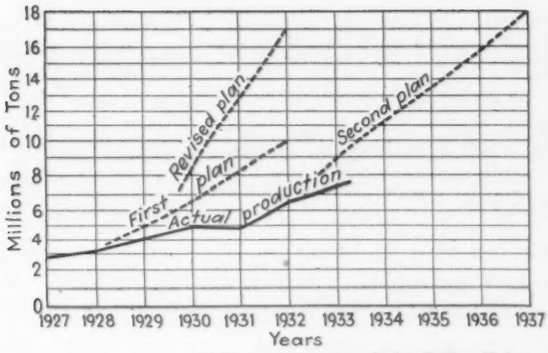
Since the advent of the Soviet regime many large metallurgical plants have been built and many are in process of construction. Three of these (Magnitogorsk, Kouznetsk and Azov) will have a combined output that will exceed the total iron and steel output of the pre-revolutionary metallurgical industry.

Conditions at the Magnitogorsk Plant

The Magnitogorsk plant in the Ural mountains and Kouznetsk plant in Siberia represent two separate units of one gigantic combine, so-called "Uralo-Kouznetsk obyedinenie" (combine). While Magnitogorsk possesses rich reserves of iron ore (magnetite), Kouznetsk is situated near one of the richest coal deposits of the world. These deposits are variously estimated by the Soviet geologists to reach 400 to 1000 billion tons of coal. The distance between these two plants is about 1500 miles, and the transportation problem is solved in such a way that railroad cars going one way will carry coal and on their way back iron ore.

When its eight 1000-ton blast furnaces are completed, Magnitogorsk will be one of the largest steel plants of the world. At present only four of these are in operation; the fifth one was scheduled to be blown in during the first quarter of 1934. The open-hearth department is evidently behind

Steel Industry



Pig iron production of the Soviet Union, actual and planned.

in its construction, as only four open-hearth furnaces are in operation. One of the largest blooming mills in the Soviet Union has been installed at the Magnitogorsk plant. Driven by a 7000-hp. motor the mill has a capacity of about a million tons of steel annually.

Although the Magnitogorsk plant has been in operation more than two years, its loading and unloading facilities are still far from being completed. The cars carrying coke from Kouznetsk are still being unloaded by hand, in spite of the fact that they are equipped with hoppers for bottom unloading. Large numbers of cars are being detained every day and the total amount of demurrage and cost of hand unloading exceeds many times the cost of trestle construction.

The Large Siberian or Kouznetsk Plant

The importance of the Kouznetsk plant lies in the fact that it will be the first large steel plant in Siberia, and its construction marks a significant step in the industrialization of this enormous country. It is proposed to build four blast furnaces at the Kouznetsk plant; two of them will be of 850 tons capacity and the others of 1200 tons capacity. At present three blast furnaces are already finished, and a mixer of 1200 tons capacity also has been put in operation. Seven open-hearth furnaces are already giving steel. The rolling department of the plant will be equipped with a rail mill. A 7000-hp. General Electric motor will supply power for the mill.

As in the case of Magnitogorsk, the Kouznetsk plant started its steel production before it was entirely completed. According to the Soviet newspaper *Za Industrializatsiu* (For Industrialization) of Dec. 10, 1933, not a single department of the Kouznetsky plant is fully protected by walls from atmospheric conditions. In the mixer department, the entire wall on the north is still unbuilt and the lubricants of the mixer mechanism freeze in the cold weather. In the open-hearth section there are no walls at all. It is not surprising, therefore, that during the severe Siberian blizzards, the production of the plant fell more than 50 per cent. Besides, due to non-completion of the trolley line, the ore brought from Magnitogorsk is being unloaded into bins directly from the railroad cars and it takes from 2 to 7 hours to unload one 50-ton car.

Azov Works in South Russia

The third big steel plant in the process of construction now is the Azov steel works in South Russia near the Azov Sea. It is planned to build there five blast furnaces; two of these are of 930 cu.m. and three of 1230 cu.m. volume, with total annual output of 1.4 millions tons of pig iron. The steel department will be equipped with three 250-ton tilting open-hearth furnaces and with six 40-ton basic convertors. There will be a rail mill of 650,000 tons capacity and bar mill of 200,000 tons capacity.

So far only one blast furnace at the Azov plant has been placed in operation. The iron ore (high phosphorus hematite) will be supplied by neighboring mines at Kamish Bouroun, which enter in the Azov combine as a part of the administrative unit. The coal will be transported by steamers from the Tkvarcheli mines, situated on the Black Sea, at a distance of about 400 miles from the Azov steel plant. While the metallurgical part of the project already is in a state of construction and partial operation, the kind of ore concentration process is not selected yet.

Second Kouznetsky Works Being Designed by Soviet Engineers

The second Kouznetsky steel works is a new gigantic project which is being designed now by Soviet engineers. It will be built near the first Kouznetsky plant, but on the other bank of the river Tom. Both plants will be connected by a railroad bridge. The planned annual production of the second plant will be about 2 millions tons of steel. While the first plant will supply rails and fastenings, the second plant is being designed for the production of rolling stock and locomotives.

Considerable attention is also paid by the Soviet engineers to the production of special steels. The output of this kind of steel will be raised from 100,000 tons in 1928 to 500,000 tons in 1934. The number of electrical furnaces available for the operation will exceed 400 in 1934.

Comparisons with Operations in Other Countries

AS the Soviet industry is owned and operated by the government, it is natural to expect that there will be some important distinctions between the Soviet way of operation and that of American and European private operation. Perhaps the time is not yet ripe to pass a final verdict, but there are already many facts at our disposal, which will throw light upon the question.

First of all we have to admit the fact that in the time of depression, while all metallurgical industries in the capitalistic countries have been curtailing their production, the Soviet metallurgical industry was expanding.

The ability of the Soviet industry to show an upward trend in the face of the depressing world trade conditions should be recognized as a positive point of the collectivistic system of production and distribution. However, the prevailing Soviet Union low standard of living makes this seeming advantage of the Soviet industrial organization somewhat less valuable. Furthermore, we also have to take

into consideration that the industrial expansion is always more feasible in a country like the Soviet Union, where the economical development is practically at the pioneering stage, than in a country like the United States, where the so-called overbuilt conditions exist.

It is not difficult to show some of the shortcomings of Soviet industrial operation. In fact, many of them are admitted by the Soviet press.

Ban on Rolling for Statistical Records

A very peculiar side of the Soviet industrial operation is revealed in a recent order by the Soviet Commissar of Heavy Industries, Mr. Ordjokonidse, prohibiting one to count in the rolled steel output the steel that is rolled for stock, or without any order from consumers. The Soviet organ of the Commissariat of the Heavy Industries *Za Industrializatsiu* (Dec. 4, 1933) commenting on Mr. Ordjokonidse's order sums it up in the following headlines: "Stop Rolling for Stock and for Tonnage Statistics." It is surely a strange situation when plants having orders for a certain kind of steel prefer to roll some other sections because they are easier to make. The trouble originated because too much stress had been previously placed on quantity production for spectacular statistical showings. Every Soviet plant was striving to take first place in accomplishing its "piatiletka."

Mr. Bardin, an eminent Russian metallurgist and a member of the Soviet Science Academy, admits that the construction of many big Soviet industrial projects has been started before their design had been worked out. According to other information in the Soviet press, in such big metallurgical plants as Magnitogorsk, Kouznetsk and Azov, the open-hearth department of the plants was not even designed while some of its blast furnaces were already operating. A similar occurrence also took place in the rolling mill industry: the installation of a continuous and universal mill at Dserjinsky plant was delayed more than eight months after the installation of the blooming mill, and, therefore, the blooming mill could not be used adequately.

The disjointedness of the different stages of steel making, which form ordinarily one continuous process, ending with the finished product, is one of the deficiencies of the Soviet operation. It is fully recognized by the Soviet administration and its elimination is set as one of the objectives of the second five-year plan.

I have already mentioned examples of the Soviet plants put in operation before they have been entirely completed. Mr. Bardin also condemns this practice and urges the elimination of the widely used Soviet expression "essentially completed," because it allows for putting into operation many incomplete plants, which should not have been operated. Mr. Bardin also promises that the eagerness of the Soviet industrialists to obtain purely spectacular results will be wholly suppressed in the future.

Comparative Economies in Men and Material

When the Soviet Government started its great construction program in the metallurgical industry, it adopted the American methods and American type of equipment—large size blast furnaces, duplex process of steel making and so on. Such plants as Magnitogorsk and Kouznetsk were designed and built largely by American firms. In regard to the operative efficiency of these plants the following interesting data are given by the already quoted Soviet publication *Za Industrializatsiu* (Nov. 27, 1933). In the first place the Soviet plants employ considerably more men per unit of equipment than the American plants. There are 270 men on the average for each blast furnace in the Soviet Union, against 116 in the United States. For each open-hearth furnace there are 140 men in the Soviet Union as against from 24 to 40 in the United States.

The consumption of materials in the process of the metal production also shows that Soviet metallurgical practice is not up to American standards yet. In the Soviet Union an average of 1.1 tons of coke is used for every ton of pig iron produced, while in America and Germany only 0.8 ton is used. The amount of air used per ton of pig iron produced is from 4000 to 4700 cu.m. in the Soviet Union and about 2700 cu.m. in the United States.

In such a vast undertaking as the Soviet industrial program it is natural to expect that in the course of its accomplishment many faults would occur. Many of these faults are admitted by the Soviet administration and are likely to be corrected in the future. Of the most importance are those shortcomings which originate in the very nature of the Soviet organization, by the absence of the profit incentive in it, by the excessive Central control, bureaucratism, over-eagerness to obtain "paper" results, fear of responsibility and so on. It will be highly interesting and instructive to watch the future Soviet industrial development and observe whether the Soviet Government will be able to overcome some of the deficiencies of operation.

Huge Casting Made For Electric Company

THE largest casting to be poured at the Trafford Foundry of the Westinghouse Electric & Mfg. Co., this cylinder base for the Philadelphia Electric Co.'s turbine generator set is 28½ ft. in length, 10 ft. in height, 11 ft. in width, and weighs 174,130 lb. The set will be installed in the Richmond station, Philadelphia, and will be rated 183,333 kva., 90 per cent power factor, 1800 r.p.m., 3 phase, 60 cycle, 13,800 volts.

Micarta Roll Neck Bearings Applied To Rod and Other Mills

Greatest Advantage is Where Roll Neck Speeds Exceed 150 Ft. per Min. and Water is Principal Lubricant

By R. P. FAIRGRIEVE
Micarta Specialist
Westinghouse Electric & Mfg. Co., Pittsburgh

THE idea of using a phenolic condensation product such as Micarta for a roll neck bearing material was first conceived a few years ago by a steel mill superintendent.

Materials commonly used up to that time included brass, babbitt, or a combination of both, and various types of wood, the most satisfactory being lignum vitae. Because of inability to lubricate the metal bearings properly, due to the general form of construction and the presence of cooling water, the life of these was comparatively short. Wood bearings, from the standpoint of lubrication, were superior to metal bearings, but because of certain inherent characteristics their scope of service was limited. Disadvantages of wood bearings are lack of uniformity, comparatively low strength, and the special handling required to prevent cracking and shrinking due to the drying out of natural moisture.

Knowing the limitations of metal and wood bearings, and being somewhat familiar with the properties of such materials as Micarta, this mill superintendent took steps to make a trial installation of such a bearing.

The construction of these first bearings consisted of longitudinal segments of fabric base Micarta machined from plate stock to conform to the shape of the existing wood bearings. The Micarta was applied in such a manner as to place the laminations perpendicular to the wearing surface. This edgewise grain direction proved superior from the standpoint of longer and more uniform wear.

Results obtained from these first bearings were so satisfactory that it was immediately decided to extend the use of this material. In order to do this as economically as possible, a molded form of construction was developed, which reduced machining and waste and provided the maximum uniformity in grain structure. This consisted of molding accurate segments to form the radial portion of the bearings as shown at *A*, Fig. 1. The thrust bearing, as shown at *B*, consists of a separate rectangular block machined to conform to the roll neck diameter and fillet. The laminations of the thrust block are also perpendicular to the wearing surface. These separate radial segments and thrust blocks are assembled in a housing or chuck as shown in Fig. 2. This complete assembly is typical of the common type of construction, although the details may vary somewhat.

First Applied to Rod Mill

The installation of Micarta bearings to which reference has been made was on a Garrett rod mill. After a successful trial on one finishing stand, all the finishing stands were similarly equipped. The results obtained on this mill soon led to the use of these bearings on numerous other rod mills.

It then became apparent that the use of Micarta bearings could be extended to other types of rolling. To learn the limitations of this material, applications were made on hot strip, skelp, billet, merchant and structural mills, and in general all these proved successful.

Several installations were made on cold sheet and cold strip mills, and in this class of service the peculiar properties of Micarta could not be utilized. In such mills, where the pressures are very high and of a continuous nature, the use of water is not required and therefore a fair lubrication can be maintained. Under these conditions adequate bearing life is obtained with the conventional metal bearings.

Micarta having the peculiar properties of functioning as a bearing with comparatively low frictional losses, with water as a lubricant, a saving in power as well as increased life are evident. The use of oil or grease in connection with the regular supply of water on these bearings has been found of little value in reducing friction and therefore may be eliminated. This results in a saving of grease costs.

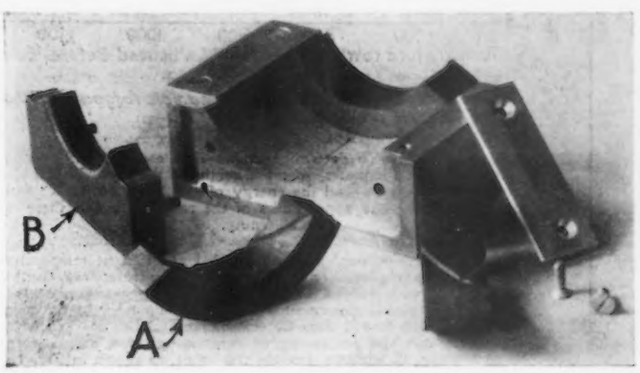
Increased Life of Bearings

A few examples of long bearing life and saving in power follow:

On an electric-driven continuous rod mill the actual power saving over a period of a month was found to be 30 per cent. The bearing life was increased an average of 10 to 15 times over that of the metal bearings formerly used. Several individual bearings in this mill showed a life as high as 50 times the normal metal bearing life.

By equipping a steam-driven Garrett rod mill with Micarta bearings in the finishing stands it became possible to operate the mill at the speed for which it was originally designed. With metal bearings in place this speed could never be obtained. Here again the bearing life was considerably increased as compared with both the metal and wood bearings formerly used.

In another instance a rod mill in a district where bad water conditions prevailed showed no economic advantage in the use of wood bearings over



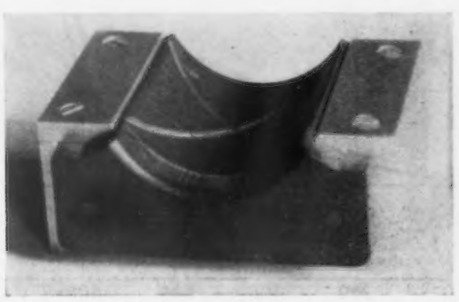


Fig. 1 at left. Fig. 2 above

metal. Micarta bearings in this mill rolled 12 times the tonnage obtained with the metal bearings and showed a decided economic advantage.

On a continuous narrow strip mill the bearing life was ten times as great as formerly obtained from brass. On another strip mill, Micarta bearings installed on two stands for trial purposes have given excellent results. Their length of service has already equalled the entire life usually obtained from bronze, and very little wear has occurred on the surface of the material. Because of the small amount of wear, the necessity for taking up the bearings frequently is reduced, and it is also possible to closely control the gage of the strip itself.

In general, Micarta bearings show to the greatest advantage where roll neck speeds exceed 150 ft. per min., and upon roll necks where water must be used as the principal lubricant.

Malleability of Nickel and of Monel Metal

EXPERIMENTS on the malleability of nickel and of Monel metal were recently made by Owen W. Ellis, director of metallurgical research, Ontario Research Foundation, Toronto. The findings were discussed by him in a paper presented to the (British) Institute of Metals at London, March 7 and 8. From this paper the accompanying groups of curves have been reproduced.

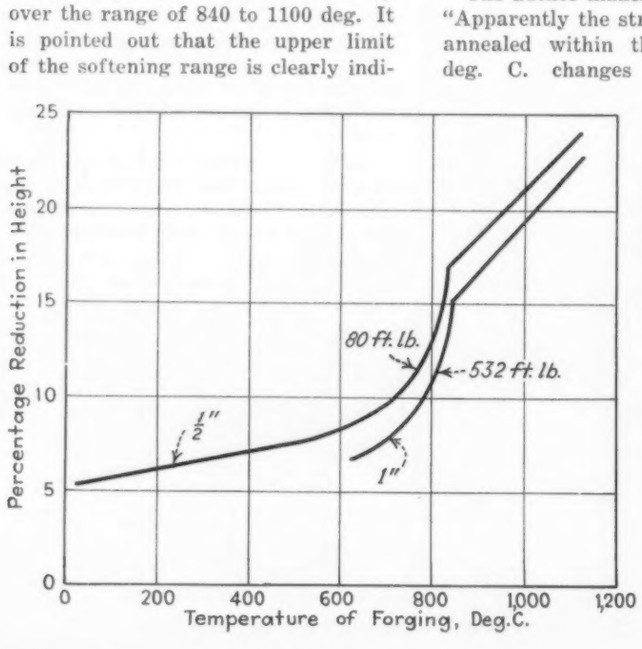
Fig. 1 shows the effect of temperature on malleability. Cold-drawn nickel rods of ½ and 1 in. diameter were forged under conditions, as described in the paper, that were replete with arrangements and apparatus for gaining accuracy. Normal samples so-called were experimented with, normal being taken to mean samples of which the heights and diameters are equal. In the case of the ½-in. material the malleability-temperature relationship was found to consist of three portions: *a*, a practically linear relationship over the temperature range of 20 to 500 deg. C; *b*, a curved relationship over the what the author terms the rapid softening range, 500 to 840 deg.; *c*, a linear relationship over the range of 840 to 1100 deg. It is pointed out that the upper limit of the softening range is clearly indicated for both sizes of samples, in that there is a sharp inflection at the 840 deg. point.

Fig. 2 gives the results of forging ½-in. nickel bar samples at 750 deg. C. to which had been imparted different initial hardness, to determine what effect the previous annealing treatment had upon the malleability at the forging temperature. The showing is that the annealing of the samples (for 10 min.) at temperatures below 750 deg. had little or no effect upon malleability at 750 deg., but when the annealing temperature was raised above 750 deg. malleability is profoundly affected. The material becomes increasingly malleable as the annealing temperature is raised until 820 deg. (or somewhat below the upper limit of the softening range). Annealing at temperatures between 820 and 860 deg. C. increases the resistance of the metal to plastic deformation at 750 deg., so that samples which have been annealed at 860 deg. are more resistant to deformation at 750 deg. than samples which have been annealed at temperatures between 820 and 860 deg.

The author makes this observation: "Apparently the structure of samples annealed within the range 750-820 deg. C. changes with increasing annealing temperature in such a way that hardening due to cold work during forging at 750 deg. does not affect the continuity of the malleability /annealing-temperature curve within this range. The structure of samples annealed within the range 820-860 deg. C., however, changes relatively so little with increasing temperature that hardening of such samples due to cold work during forging at 750 deg. C. reduces their malleability below what might be expected and gives rise, therefore, to the sharp inversion of the malleability/annealing-temperature curve at 820 deg."

The effect of annealing cold-drawn nickel at various temperatures, before forging at various temperatures, was also investigated. It appears that annealing at any temperature above the lower limit of the softening range increases the malleability of the metal at all forging temperatures up to the temperature of annealing, beyond which the malleability-temperature relationship for both cold-drawn and annealed materials is the same.

For Monel metal, the relationship of malleability and temperature shows curves of the same type as those for nickel. The forgings experiments on Monel metal were made on 1-in. round samples of cold-drawn stock.



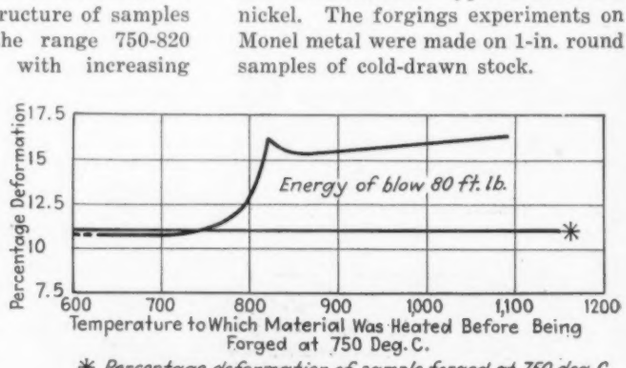


Fig. 1 (at left)—To determine malleability each sample was subjected to a drop hammer test; the height of the drop for the ½-in. samples was 8½ in. and the energy of the blow, 80 ft.-lb. Sharp inflections mark the upper limits of the range in which there is a softening.

Fig. 2 (above)—Samples were annealed at different temperatures and then the malleability at a given temperature, 750 deg. C., determined, with results that indicate an increase (reversal) of resistance to plastic deformation in samples annealed in the neighborhood of 820 to 860 deg. C. The horizontal line marked with a star represents the percentage of deformation of a sample forged at 750 deg. C. without previous treatment, as shown in Fig. 1.

Hollow Metal "Lumber" and New Form of Steel Roofing Developed

Steel roofing, formed with a hollow bead on the female edge and a collapsible bead on the male edge, interlocks so that water cannot be drawn into the seam by capillary attraction. Steel weatherboard is identical with the roofing, except that the latter has transverse beads for appearance.

HOLLOW metal "lumber" for framing of buildings is a new steel product for use in residences and other light construction. The sections, in the same dimensions as wood framing material, are fabricated in one operation in one set of rolls in a cold-roll forming machine in which, after forming to identical shape, two sections are seamed together at diagonal corners into the finished form, having two body sections and a corrugated and beaded edge and flange.

The lumber is made of 22-gage copper-bearing sheet steel in sections 2 x 2 in. to 2 x 8 in. and also in 4 x 4 in., the latter size being made by spot welding together two 4 x 2-in. sections. The two sides have transverse beads every 9 in. to add strength, except in the 4 x 4-in. sizes, which have longitudinal beads in the side members.

When the sections of the framework are in place they are spot-welded together with metal cleats, especially designed for this purpose. The welding is done with a portable spot welder.

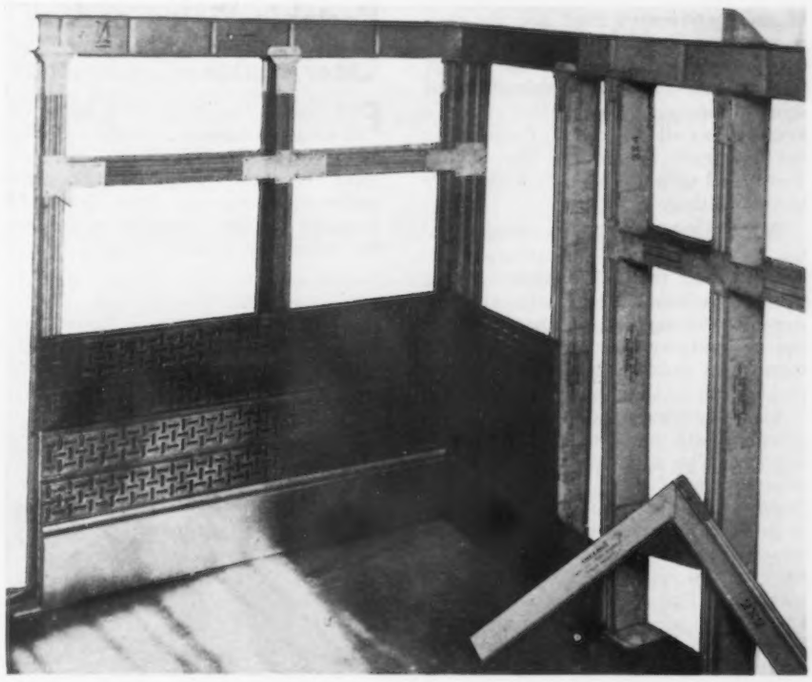
The sections are rolled in standard lengths and cut to required lengths in the shop, the same as wood framing material, and are assembled on the job. If metal lath is used, it is spot welded to the frame. The steel framing, in addition to being fireproof, is claimed to have strength equal to that of wood framing of similar dimensions. Under compression tests a 2 x 4-in. section 4 ft. long sustained a 10-ton load and a 4 x 4-in. section of similar length sustained a load of approximately 20 tons. While the material costs more than wood, it is stated that it can be erected more rapidly than the wood frame, thus reducing the erection cost. The steel lumber was developed by William O. Sheldon, 703 Society for Savings Building, Cleveland, who has recently been granted patents covering the product and the method of manufacturing it.

A new form of steel weatherboard and roofing has also been brought out by Mr. Sheldon. This, also made in a cold-forming machine, is formed with a hollow bead on the female edge and a collapsible bead on the male edge, the latter being forced into the former, causing the interlocking of the two edges and providing a double seam along the edge and two air spaces at the joint that prevent drawing water into the seam by capillary attraction.

When laying the material the lower edge of a piece is fitted into the upper edge of the adjoining piece beneath, and the upper piece, moving as a hinge, is pushed over until it contacts with the studding or rafter to which its upper edge is then spot welded. Insulating material is applied to the inside of the weatherboard before it is laid.

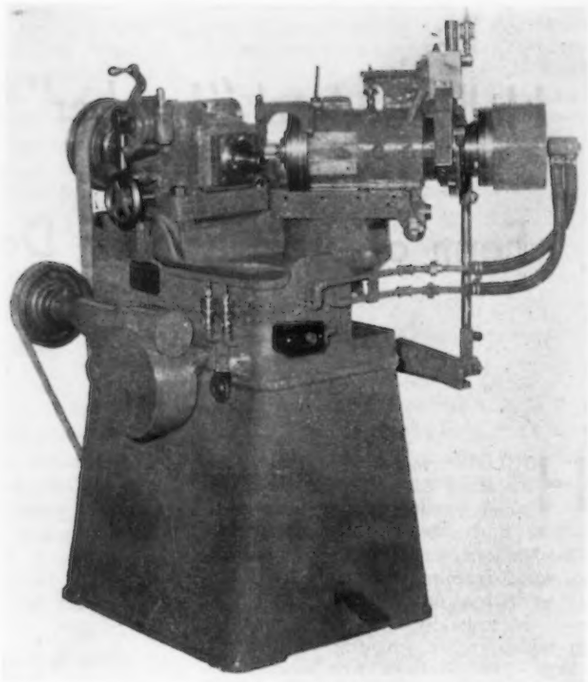
The strips of material are made the full length of the wall or roof so that there are no transverse joints. They may be produced in any width, although a 9 in. or 10 in. width is regarded as preferable.

The only difference between the weatherboard and roofing is that the latter is provided with transverse beads for appearance. These are formed in the last pair of rolls in the forming machine, and rolls may be provided for any desired variation in the beading.



Hollow steel lumber is spot-welded together with cleats. Then metal lath is spot-welded to the assembled frame.

Heavy-Duty Gear Tooth Chamfering Machine Operates at High Speed



Working parts have been redesigned and strengthened, and changes have been made to assure close tolerances in chamfering.

GEAR teeth may be chamfered at speeds up to 150 teeth a minute on the machine here pictured, which is built by W. C. Lipe, Inc., Syracuse, N. Y. The machine operates on the same principle as the gear tooth chamferer produced by the company for several years, and includes also the high-speed index principle more recently incorporated. In the latest model, however, working parts have been strengthened and redesigned in keeping with the high speeds possible with this index, and changes have been made to assure the close tolerances now required on chamfering operations.

New feed and index cams provide smoother action and better finish. The cutter spindle assembly has been completely redesigned. The spindle is mounted on preloaded ball bearings, and the square sleeve in which the spindle rotates has been increased in size to provide longer wear and greater rigidity. The rack and pinion for driving the square sleeve are made of pre-heat-treated steel and the rack is mounted so that it can be turned end for end as wear occurs, or can be replaced without replacing the square sleeve. The cutter spindle housing has oil reservoirs, from which the lubricant is fed to the square sleeve and spindle through wick oilers in the casting.

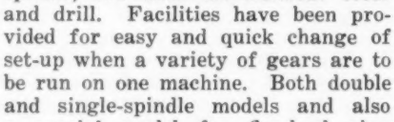
Worm feed carriage for the workhead permits rapid and accurate adjustment of the work when setting up the machine. Precision scales are provided for registering the setting of the various adjustments, and the worm feed carriage has a vernier dial in addition to the scale readings.

The hardened index plates have ground teeth to assure accurate indexing. The greatly increased speed of operation further necessitated redesign of the worm drive. The worm is now ball-bearing mounted and the housing has been changed to permit ready accessibility and to eliminate oil leakage. The base of the machine has been inclosed. Foot-control air valves can be supplied as optional equipment where maximum speed of operation is required.

The new machines will chamfer all types of gears and pinions, spur, helical, internal, intermittent and spiral bevel, and will also chamfer splines, cut back intermittent teeth and drill. Facilities have been provided for easy and quick change of set-up when a variety of gears are to be run on one machine. Both double and single-spindle models and also a special model for flywheel ring gears are built.

Portable Pinion and Gear Puller

FOR use in the shops of a large coal mining company, Smith Devices, 2245 North Twelfth Street, Philadelphia, recently furnished the pinion puller here shown. This device has capacity of 125 tons and is designed for removing pinions from 4 to 8 in. in diameter and up to 10 in. width of face. It is mounted on a goose-neck portable truck and may be raised or lowered to suit the height of the gear or pinion that is to be removed from its shaft.

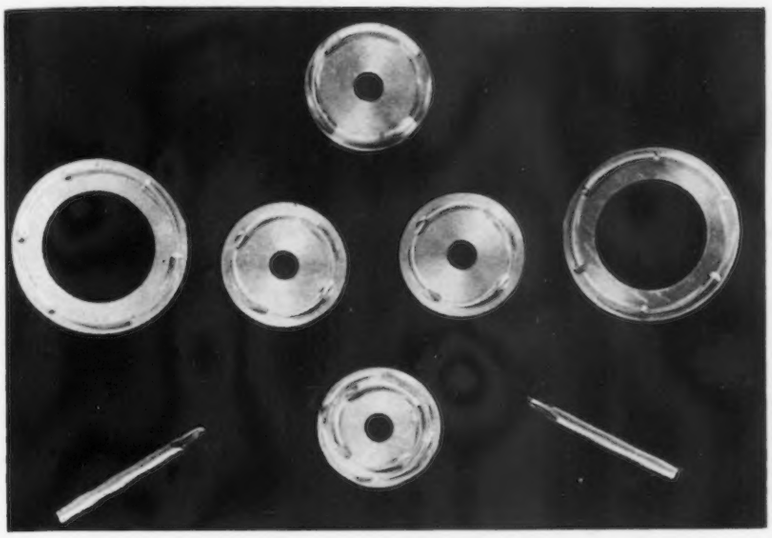


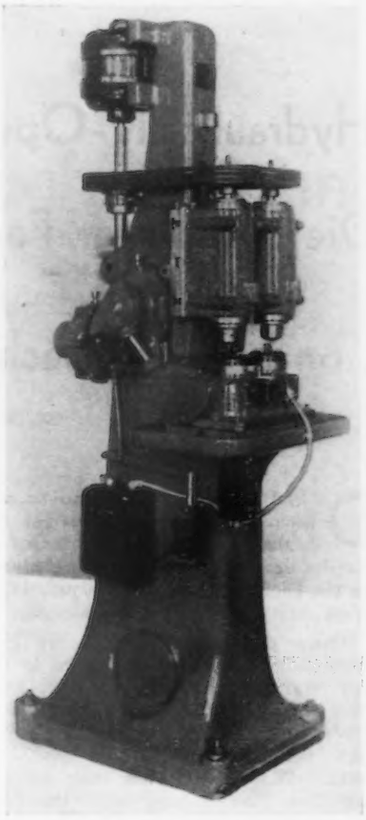
The puller may be raised or lowered to suit the height of work.

The device is operated manually by means of a crank handle that fits the ends of two screws, one of which is a take-up screw for taking up slack before removing the gear or pinion by the other screw, which actuates a wedge and roller arrangement assembled in the housing. It is stated that with one man pulling with a 20-in. leverage on the power screw a pulling pressure of 75 to 100 tons can be developed. The jaws that fit over the gear or pinion are easily applied. Reducer jaws such as shown in the foreground are used for removing the smaller pinions, these jaws being set back over the pinion on the shaft. Hooks, jaws, saddle and other components of the device are made of heat-treated alloy steel.

Other sizes of the pinion puller with capacity up to 300 tons are made, as well as units for removing pulleys. These may be had with or without the portable truck, which is for floor work. In addition to the standard pinion jaws, a set of four hooks that are adjustable for different types of gears and pulleys can be furnished.

A classified list of the more important books, serials and trade publications appearing during 1933 has been compiled by E. H. McClelland, technology librarian, Carnegie Library of Pittsburgh, Pittsburgh, in the shape of a 24-page pamphlet, printed for general distribution.





Typical clutch disks produced by the profile miller are shown at upper left.

Profile Miller Cuts Elongated Grooves in Clutch Disks

AN adaptation of a standard machine tool to single-purpose manufacturing uses, the profile milling machine illustrated has been furnished by the Automatic Machine Co., Bridgeport, Conn., for cutting elongated grooves, tapered in width and depth, in chrome-molybdenum clutch disks. The grooves must be exactly duplicated in pairs, and right and left hand to match. One machine was furnished for cutting four and another for cutting six grooves in each disk.

High-speed die cutters of fish-tail type, running at 2400 r.p.m., are used. They are held in precision collet chucks, and up and down location is adjustable by means of a screw that extends to the top of the spindle. Work-holding spindles run right and left hand and are driven by worm and gears. Stopping of the operation at the end of the last cut is controlled by a limit switch actuated by a knob in front of the left-hand work spindle.

A 2-hp. balanced motor at the top rear of the column drives the vertical power shaft on which the V-belt drive pulley for the spindles is mounted. The motor is controlled by start and stop push buttons on the right-hand side of the machine. At the bottom of the vertical power shaft there is a worm and worm gear in which is incorporated a clutch actuated by a solenoid. The worm and gear, through the clutch, drive the horizontal shaft. This shaft, in turn, drives through another worm and gear to the camshaft, the cam on which controls the vertical movement of the slide holding the cutter spindles. On the end of the camshaft, and on the outside of the machine, are mounted bevel gears that transmit power through a short angular shaft and another pair of bevels to the work-holding fixture. In the machine for the four-grooved disk, the work-holding spindles revolve once to four revolutions of the camshaft, and in the six-grooved disk, they revolve once to six revolutions of the camshaft.

With the motor running, the work is placed in the fixture and the "start" button pressed. This releases the solenoid which permits the clutch to engage and drive the camshaft and work spindles. At the completion of one revolution, the limit switch is engaged by the knob on the left-hand work spindle; this actuates the solenoid, disengaging the clutch and stopping the work operations.

Production is 60 pairs or 120 disks grooved per hour. The machine is adaptable to any work of a similar nature. It occupies floor space of only 24 x 34 in., and weighs 1750 lb.

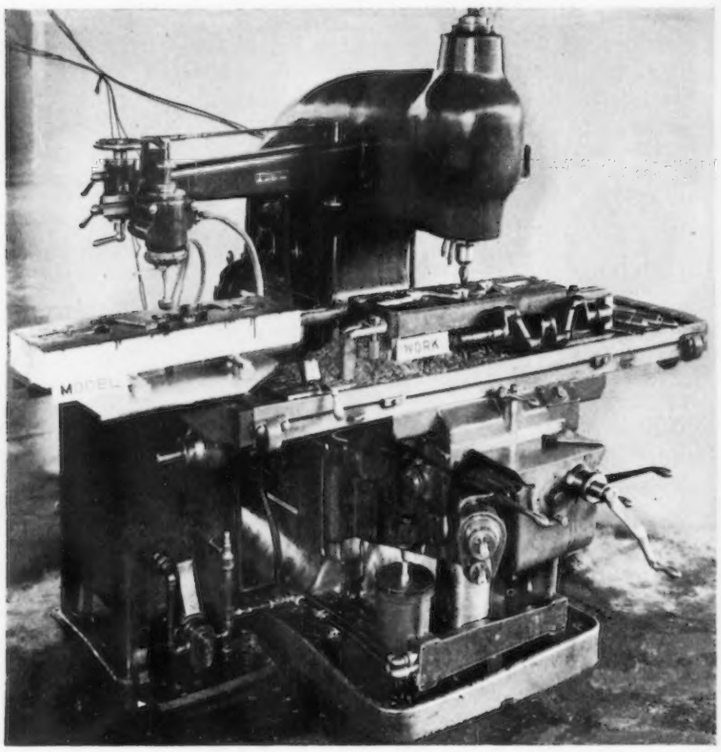
Electrode Produces Class I Welds in Any Position

THE new general-purpose welding electrode, the type W-22, recently added to the line of the General Electric Co., Schenectady, N. Y., is of heavily-coated or shielded-arc type for producing welds of the quality required by the A.S.M.E. boiler code for class I pressure vessels. A feature is that it may be used in any position, that is, for flat, vertical or overhead welding; at the same time it has deep penetrating properties, and is equally suitable, therefore, for butt and fillet welds.

Tests on all-weld-metal specimens made from this electrode show the following average results: Tensile strength, 65,000 to 75,000 lb. per sq. in.; elongation, 20 to 30 per cent in 2 in.; and impact resistance, 30 to 45 ft.-lb. (Charpy). It is further stated that the welded joints average 35 to 60 per cent elongation when tested by the free bend method and X-ray, class I.

As these physical properties are obtained without regard to the position in which the welds are made, there is no necessity for moving the work so that welding may be done in a down-hand position. The W-22 electrode has a wide field of application in the fabrication of large structures, the moving of which into a special position is impossible or impracticable, and may be used to advantage also in the welding of nozzles, flanges and other fittings to pressure vessels, where handling costs are less if positioning of the work is

Hydraulically-Operated Die Duplicator For Use on Milling Machines



DUPLICATORS which can be attached to ordinary vertical or horizontal milling machines for die duplicating work are being made by the Clearing Machine Corpn., 6499 West Sixty-Fifth Street, Chicago.

These duplicators, which are hydraulically operated, are made to fit any standard milling machine, and they have the advantage that they leave the milling machine entirely intact for regular milling machine work. It is stated that they do not interfere in any way with the full working range in any direction and no part of a duplicator need be removed when the miller is to be used for regular work. All that is necessary to convert the machine for die duplicating work is to press an electric button to start the hydraulic pump. Pressure on another button stops the pump, and the milling machine is ready for all standard work. Masters made either from hard or soft materials such as plaster, wood, steel, etc., may be used. The device is extremely sensitive and is arranged to allow use of maximum feeds in all directions.

Each duplicator consists of an oil storage tank which is equipped with a motor-driven centrifugal pump. Under the knee of the machine there are two hydraulic cylinders that move the knee and table up and down. An extension, which carries the master is permanently attached to the end of the table. A tracer arm, attached to the frame of the machine overhangs the table extension, as shown.

The device is set in motion by a push button which starts the oil pump motor. Oil flows through a manifold to the control valve which is actuated by the tracer and which is mounted at the free end of the tracer extension arm. Oil flows through the tracer valve to the cylinders under the table which moves up to the tracer and the cutter. The rise and fall of the table thereafter is under complete control of the tracer-actuated valve.

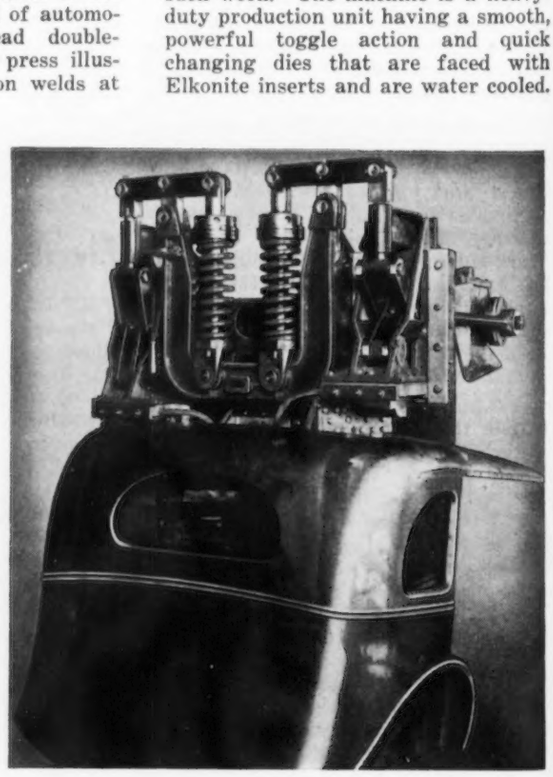
A safety device drops the table if the cutter should happen to be mounted lower than the tracer, thereby avoiding damage to the cutter. For ordinary roughing work a rubber tracer tip is used and either aluminum or steel tips are furnished for finishing cuts.

Press Makes 16 Welds At Each Stroke

IN welding two gusset plates to the top rail and back panel of automobile bodies, the two-head double-stroke projection welding press illustrated makes 16 projection welds at each stroke, or 32 welds with each revolution of the crank. The machine is a new product of the Thomson-Gibb Electric Welding Co., Lynn, Mass.

The work is done with the minimum of handling, and the welds are smooth, clean and strong. The cost of welding is said to be less than half that of the method formerly employed in such work. The machine is a heavy-duty production unit having a smooth, powerful toggle action and quick changing dies that are faced with Elkonite inserts and are water cooled.

The die duplicator attachment pictured above does not interfere with regular operation of the milling machine.



Welding of two gusset plates to top rail and back panel of automobile body is shown at right. The machine is a special Thomson-Gibb welding press.

Gear Makers Hold Annual Meeting

Statistics Show Increased Business—Possible Skilled Labor Shortage Gives Concern—Code Operation Reported On—Technical Topics Prominent on Program

FIVE general sessions and the annual banquet comprised the 18th annual meeting of the American Gear Manufacturers' Association, held at the Penn-Lincoln Hotel, Wilkinsburg, Pa., May 3-4. Following the banquet, the last event of the convention, there was a meeting of the gear manufacturing industry, attended by non-members as well as by members of the A.G.M.A. This meeting, held on the morning of May 5, was devoted chiefly to reports on the operation of the code.

More than 10 papers, on a variety of topics, and the progress reports of some 15 technical committee chairmen, were presented at the regular sessions. Of the former, a paper devoted to development of a speed reducer rating formula, and a lecture on noise measurement of gears were among those receiving high commendation. Publication in the near future of a bound volume of the association's recommended practices was one of the outstanding technical committee proposals.

Officers and directors were elected, as listed in another column, and two companies were admitted to full membership and seven to affiliate membership. The former are: Bilgram Gear & Machine Co. and the Link-Belt Co., both of Philadelphia. The new affiliate members are: Abart Gear & Machine Co., Cicero, Ill.; J. Morrison Gilmour, New York; Hartford Special Machine Co., Hartford, Conn.; Indiana Gear Works, Indianapolis; Moore Gear & Mfg. Co., St. Louis; New Jersey Gear & Mfg. Co., Newark, N. J.; and the Precision Gear & Machine Co., Charlotte, N. C.

Oppose Wagner-Connery Bill

Better business in the gear industry—an increase of about 100 per cent during the first quarter of 1934 as compared with the same period a year ago—was reported by President E. W. Miller, chief engineer, Fellows Gear Shaper Co., in his opening address.

Recent action by the executive committee in the interest of the industry included the following telegram to Washington relative to the Wagner-Connery bill.

"The executive committee of the American Gear Manufacturers' Association . . . strongly opposes consideration of the Wagner-Connery bill S2926-HR 8423. Passage of the bill would restrict the freedom of highly skilled labor in the gear industry and result in unreasonably high cost of our products to the consuming public. We urge a moratorium on all labor legislation now pending, in order that the natural recovery now taking place can become effective."

An appeal was also made to the Durable Goods Committee at Washington to postpone any further decrease in working hours in the gear industry. The telegram was in part as follows:

"The gear manufacturing industry is heartily in accord with the National Industrial Recovery Administration in its laudable effort to give additional men employment and increase purchasing power through fair compensation of labor. But it is desirous of registering the predominating judgment of the members of the industry that it is of the utmost importance that any further decreasing of working hours as specified in the code of the gear manufacturing industry be postponed until such time as it can assimilate and recover from the effects of the drastic reduction of working hours affected by the adoption of its code, and thus safeguard its membership from any further depletion of their limited resources.

Serious Shortage of Skilled Labor

"The gear manufacturing industry is comparatively small, employing at the present time about 4000 men in its shops, 84 per cent of whom are highly specialized machinists, being paid on the average in excess of 65c. and in many cases up to 85c. an hour. Of such skilled labor there is at present in most districts a most serious shortage, as has been revealed by returns from advertisements placed recently in newspapers for such help. This industry is now employing 80.3 per cent of such skilled workers as were employed in 1926 and it would be impossible to secure anything like 10 per cent additional trained gear cutters.

"The gear manufacturing industry is composed largely of small companies and firms and the further reduction in working hours with wages sustained on the basis of the present weekly schedule will work irreparable harm to such enterprises, making it necessary to set up a series of one-man departments to provide additional shifts in parallel with present operating conditions, with consequent inefficiency and increased supervisory expense.

"A reduction of hours in this industry will so seriously affect costs as to raise prices to a prohibitive level

New Officers and Directors

PRESIDENT: John Christensen, president, Cincinnati Gear Co., and one of the founders of the A.G.M.A.

VICE-PRESIDENT: A. A. Ross, engineer, General Electric Co., West Lynn, Mass.

TREASURER: J. Harper Jackson, Pittsburgh Gear & Machine Co.

SECRETARY-MANAGER: J. C. McQuiston, Penn-Lincoln Hotel, Wilkinsburg, Pa.

DIRECTORS:

E. P. Connell, Falk Corpn., Milwaukee.
Howard Dingle, Cleveland Worm & Gear Co., Cleveland.
E. W. Miller, Fellows Gear Shaper Co., Springfield, Vt.
E. S. Sawtelle, Tool Steel Gear & Pinion Co., Cincinnati

and thus seriously retard the flow of business which is now showing encouraging signs of increase.

"We appeal to you, therefore, to leave this industry undisturbed and give it an opportunity to adjust itself to the change from the 54-hr. week previously prevailing to the 40-hr. week made effective with the signing of the code."

Urges Loyalty to NRA Obligations

In reference to the code of the gear manufacturing industry, created and sponsored by the association, Mr. Miller commended the code committee, the intensive work of which resulted in unusually rapid formulation and approval of the code, and at a very nominal expense. Speaking of the NRA, he said: "It seems apparent that we should sustain it and do our best to carry it through. Perhaps history will indicate this as a mismove on the part of our Administration. On the other hand—and this I believe probable—much good may result from this kind of experiment. Whatever may become of it as such, there will remain something of value and of help to assist us in our industrial relationships and our economic advance. Let us all resolve that we will carry through loyally our obligations with respect to the National Recovery Act."

From the reports of the chairman of the Code Authority, H. H. Kerr, and of the various area chairmen, at the meeting of the gear manufacturing industry on the morning of May 5, it was apparent that the industry as a whole has made a sincere effort to live up to the code. Operation under the code seems to have been for the most part satisfactory, although not without some difficulties. There have been no labor troubles, but shortage of skilled mechanics due to cessation of apprentice training and the migration of skilled mechanics into other industries and occupations during the depression was emphasized in virtually all reports. With the smaller supply of skilled labor, overtime is more necessary and costs are correspondingly higher—a situation that may present difficulties as volume of production increases. Some members feel that adjustment of code minimum hours should be made in some classes of skilled labor, such as millwrights and repair and service men.

H. H. Kerr, president, Boston Gear Works, Inc., North Quincy, Mass., and chairman of the Code Authority, was chairman of the meeting, and J. C. McQuiston, secretary-manager of the A.G.M.A., was secretary.

Area chairmen from the A.G.M.A. are: H. H. Kerr, New England; R. C. Ball, president, Philadelphia Gear Works, Metropolitan area; Howard Dingle, president, Cleveland Worm & Gear Co., Central; F. H. Fowler, Foote Bros. Gear & Machine Co., Chicago, Western area; Richard Ferguson, president, Ferguson Gear Works, Gastonia, N. C., Southern area; and F. B. Drake, president, Johnson Gear & Mfg. Co., Ltd., Berkeley, Cal., Pacific Coast area.

JOHN CHRISTENSEN
President

A. A. ROSS
Vice-President

Alternates from the A.G.M.A. are: E. S. Sawtelle, Tool Steel Gear & Pinion Co., Cincinnati; J. Harper Jackson, Pittsburgh Gear & Machine Co., and L. R. Botsai, Nuttall Works, Westinghouse Electric & Mfg. Co.

Cutter P. Davis, Winfield F. Smith, Inc., Springfield, N. Y., is member of Code Authority not in the A.G.M.A., and Rodney N. Davis, Philadelphia, is alternate. The Government representative is now John M. Wilson.

NRA—Today and Tomorrow

In an address on "NRA—Today and Tomorrow," Howard S. Dingle, president, Cleveland Worm & Gear Co., at the same session, invited consideration of good features of the NRA and how they could be retained when the present act of Congress expires in June of next year.

"We talk about the codes without using the full phraseology of the act," he pointed out. "Every code bears the title 'Code of Fair Competition for Blank Industry.' To my way of thinking, fair competition is the biggest thing we have to get out of the codes, and the one we should fight to retain."

Open price provision is another, he said. "It was clearly brought out in Washington that this is the outstanding defense against the chiseler. We know of many buyers, prone to try for an inside or unfair price, who now gracefully accept the dignified statement, 'That is our price as filed with the Code Authority; we cannot cut it.' And the same type of buyer can no longer get away with misrepresenting a competitor's price, which is filed with the Code Authority and is therefore known to all."

"It behooves business men to make a success of the codes of NRA and to work through their trade associations to perpetuate those things we have gotten through the NRA as a lasting gain to business," said Mr. Dingle in another part. "Admitting the difficulty of policing the code, we can, by voluntary acquiescence, make the fair competition features a success. Above all, during the life of the present NRA, and certainly if legislation is enacted to perpetuate it when the National Industrial Recovery Act expires, we should fight to retain the idea of self-government of business under Federal supervision, rather than a dictatorship of business by Government or bureaucratic control. If, as I believe, something akin to NRA is here to stay, isn't it better to make the best of it? For, in attempting to upset or avoid it, we may get something far worse if the present recovery plan should fail."

Controlled Profit Motive Useful

The profit motive and whether it can be controlled and made a useful rather than a destructive force were discussed interestingly by Ralph E. Flanders, president, Jones & Lamson Machine Co., Springfield, Vt., in an address on "The Future of Private Enterprise," at the annual banquet on the evening of May 4.

In thinking about the usefulness, righteousness and possible continuance in our society of the profit motive, Mr. Flanders said that he had come to the conclusion that in many of its aspects it is rough and crude. Although in some instances in the past few years it had been unbridled, it has also been an organizing and desirable social force. The profit motive, he pointed out, has built up the most tremendous organization, social and economic, for the production of material goods that the world has conceived up to this time. The end

J. HARPER JACKSON
Treasurer

J. C. McQUISTON
Secretary-Manager

to be aimed at is not the destruction of the profit motive, but the determination to make it serve the social order through suitable safeguards. Application of the engineering approach in such control was urged.

Gear Standardization Committees Active

ALTHOUGH code matters were prominent, a wealth of technical material shared the program of the regular sessions of the A.G.M.A. Reports of the various standardization projects, under a general committee ably headed by A. A. Ross, engineer, General Electric Co., revealed that this important work continues to receive generous attention.

The library committee, with M. T. Schumb, engineer, Boston Gear Works, Inc., chairman, is preparing three handbooks. One, to be published soon, is a bound volume of all A.G.M.A. recommended practices and some of the outstanding technical papers presented before the association. Another is a gear data handbook edited by Prof. Earle Buckingham. This includes tables and formulae not covered by A.G.M.A. recommended practices, and is said to embody material not heretofore conveniently available. The third handbook will be devoted to standards and tables useful in the gear manufacturing and not covered by the other volumes.

It was voted to adopt as A.G.M.A. recommended practice the A.S.A. recommendations relating to keys and keyways for shafting. Keystock sizes are the same as before. The program of the keyway committee, with R. B. Zerfey, engineer, Tool Steel Gear & Pinion Co., chairman, is to include a new item, namely, the standardization of involute splines.

Recommended practice for computing the load carrying ability of metal spur gears was accepted. This had been offered as a "suggested practice" by the spur gear committee in 1932, but acceptance was deferred pending check by members in their own practice. Prof. Earle Buckingham, is chairman of this committee.

Data on depth of case hardening is being collected by the metallurgical committee, headed by Chester B. Hamilton, Jr., Hamilton Gear & Machine Co., Ltd., Toronto, Canada. Results of an interesting series of wear tests of worms of different materials at his plant was also reported by Mr. Hamilton.

The electric railway gear committee, T. R. Rideout, Nuttall works, Westinghouse Electric & Mfg. Co., chairman, is working on tables of backlash, markings, table of tooth parts, and existing discard gages. Progress is being made on its "tip relief" item.

Gear Dynamics Nomenclature

D. T. Hamilton, engineer, Fellows Gear Shaper Co., and chairman of the A.G.M.A. nomenclature committee, reported progress on symbols for gear dynamics, and nomenclature for types of gearing. A sprocket nomenclature will be presented at the next meeting. The herringbone gear committee, headed by Ira Short, engineer, Westinghouse Electric & Mfg. Co., South Philadelphia, is developing a tooth load formula. The bevel and spiral bevel gear committee, F. E. McMullen, Gleason Works, chairman, is working on tolerances for bevel gears, and the non-metallic committee, on tolerances for non-metallic gearing.

In reporting for the special research committee on gears, Prof. Earle Buckingham, Massachusetts Institute of Technology, said that a new surface fatigue testing machine has been installed for studying certain factors of wear for materials. Tests on nitrided steel, begun a few months ago, were said to appear to give further confirmation to the statement that there is no definite endurance limit on the harder grades of steel, say above 400 Brinell. Two of the several nitrided specimens had soft cores; at the beginning of the tests of these, a scalloping of the surface, indicating plastic flow beneath the case, was noticed. As the testing proceded, however, these scallops disappeared. Five different kinds of wear and also lubricants under extreme pressure conditions are being studied with this machine. The committee is ready to repeat Lewis machine tests of helical gears, but is awaiting samples, which should be 16 in. in diameter with the mating gear 6 or 8 in. in diameter.

American recommended practice for gear materials and blanks, alloy steel, cast steel, forged and rolled carbon steel, bronze and brass, has recently been released by the A.S.A., according to B. F. Waterman, engineer, Brown & Sharpe Mfg. Co., and A.G.M.A. representative of the Sectional Committee on Standardization of Gears. The A.G.M.A. inspection practice is under consideration by the sectional committee.

Papers Cover Both Technical and Commercial Subjects

OF the nine papers and addresses at the A.G.M.A. annual meeting five were devoted to technical subjects. They included a lecture and demonstration of "Noise Measurement of Gears," by F. A. Firestone, assistant professor of physics, University of Michigan, who has for several years directed investigations relating to the measurement and reduction of noise in machinery and machine parts, including gears.

Another outstanding contribution was a comprehensive paper on "Helical and Herringbone Speed-Reducer Ratings," by W. P. Schmitter, Falk Corpn., Milwaukee. The final rating of a speed reducer must be based, it was stated, on the weakest of the following factors: Gears, surface failure and strength against breakage; bearing loadings; shaft strength in torsion, bending and combined bending, more particularly foundation and bearing bolt stresses. The paper deals mainly with the derivation of a contact stress equation, the main purpose of which is to limit the gear loads to a value that assures freedom from surface failure. The role of lubrication is discussed briefly, and the paper includes numerous charts and figures.

Representation of gear manufacturers as a unit on the sectional committee for the standardization of speeds of machinery was urged by B. S. Weaver, General Electric Co., in a paper on "Advantages of Standardization of Gear Speeds and Establishing of Application Service

Factors." Cooperation between makers of mechanical transmissions will permit this group of manufacturers to obtain the maximum benefit from the proposed standardization, along with the machinery builder and the motor manufacturer, it was held.

Gear Steel Selection Discussed by Engineer

Gear Steels, their selection and heat treatment, were discussed by T. R. Rideout, Nuttall works, Westinghouse Electric & Mfg. Co., from the standpoint of the design engineer in a jobbing shop, in a paper on "Steels for Heat-Treated Gearing."

In any given application the three principal considerations affecting selection of the steel and its heat treatment are the duty which the gears must perform, the conditions under which they operate, and the design of the gear itself. Heavy loads require steels that can be heat treated to obtain great strength, whereas shock loads require a high degree of toughness. Pulsating loads, as well as high speeds with the accompanying repetition of impacts, necessitate a high endurance limit to avoid fatigue failures. Heavy loads as well as extremely high speeds, require hard and wear resisting materials, which frequently must be tough and shock resisting. High impact values and toughness are necessary for quickly reversed and suddenly started drives.

The conditions under which the gears must function were said to be almost as important as the loads themselves. The most outstanding are: The mounting of the gears, the lubrication, and the efficiency of the maintenance. Design of the gear that is to be heat treated was emphasized as of major importance, not only from the manufacturing standpoint but also in the selection of the steel and its heat treatment. When quenched, steels have a tendency to distort in some manner, a highly undesirable thing for most applications. In general, unsymmetrical shapes, thin sections adjacent to heavy masses, large areas of thin sections, and poor proportioning are potential causes of distortion and, sometimes, cracking in quenching. If such conditions are unavoidable, steels which have a low degree of distortion, or that will give suitable properties with a quench less drastic than usual, should be used.

Wear Resistance Emphasized

Qualities which a steel should possess to meet the various service and manufacturing requirements were listed as follows: Ability to withstand wear; strength; static toughness; impact toughness; low amount of distortion; ease of machinability; and susceptibility to and ease of heat treatment.

As to the wear resistance, Mr. Rideout said: "Listing the ability to resist wear as primary importance may seem strange. The reason, however, is apparent when it is considered that properly designed and correctly treated gears give far less trouble from tooth breakage than from rapid wear and that, unlike some of the other service conditions which may or may not be present, all gears are subject to wear."

The paper includes a brief discussion of both plain carbon and alloy gear steels. Heat treated plain carbon steels are used more commonly in the industrial field. Use of untreated alloy steels for gears was said to be seldom if ever justified. It was stated that heat-treated alloy steels have some advantages over heat-treated plain carbon steels, but those advantages while important, are not as numerous nor as great as generally supposed. To aid in deciding on the particular kind of alloy steel to use for gears, the paper outlines some of the more important characteristics imparted by the different alloying elements.

Other papers, further reference to which is planned for subsequent issues, included "Selling Gears to Special Fields," by L. A. Graham, sales manager, Falk Corpn., Milwaukee, and "Controlling of Costs and of Employee Compensation," prepared by W. A. Barr, manager of manufacturing, Foote Bros. Gear & Machine Co., Chicago, and presented in Mr. Barr's absence by J. R. Fagin of the same company. An address on "The Machine Hour Rate—Its Importance and Computation," by C. L. VanSickle, assistant professor of accounting, University of Pittsburgh, was a feature of the afternoon session, May 4.

B. F. Waterman, engineer, Brown & Sharpe Mfg. Co. and chairman of the A.G.M.A. program committee, and J. C. McQuiston, manager-secretary, received commendation for the program arrangements. In introducing the new president and other officers of the association at the banquet, E. W. Miller, the outgoing president, called attention to Mr. McQuiston's efficient management of the meeting. This brought enthusiastic response.

April Daily Steel Output 13.4 Per Cent Above March—Was 54 Per Cent of Capacity

APRIL production of open-hearth and Bessemer steel ingots amounted to 2,935,631 gross tons, an increase of nearly five per cent over March, while the daily rate of output at 117,425 tons was 13.4 per cent ahead of the preceding month. As reported to the American Iron and Steel Institute by member companies April output engaged the industry's capacity at 54.19 per cent, as compared with 47.81 per cent in March. Only in July, 1933, when production reached 58.95 per cent, has the April rate been exceeded in the last three years. In April, 1933 the industry operated at 25.8 per cent of capacity.

The April increase was the fifth consecutive gain in steel production since a low of 27.26 per cent was reached in November.

PRODUCTION OF OPEN-HEARTH AND BESSEMER STEEL INGOTS
(Gross Tons)

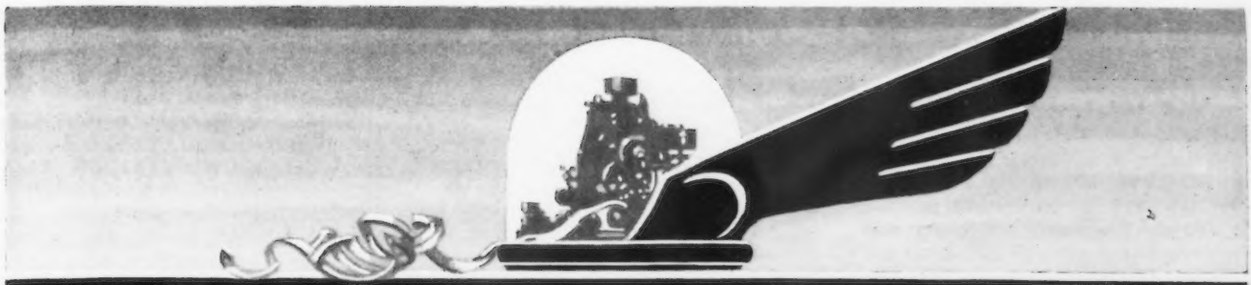
Reported for 1933 by Companies Which Made 96.57 Per Cent of 1932 Ingot Output

1933	Open-Hearth	Bessemer	Calculated Output All Companies: Monthly	Calculated Output All Companies: Daily	No. of Working Days	Per Cent Operation
January	885,743	109,000	1,030,075	39,618	26	18.23
February	922,806	126,781	1,086,867	45,286	24	20.83
March	784,168	94,509	909,886	33,699	27	15.50
April	1,180,893	135,217	1,362,856	54,514	25	25.08
May	1,716,482	216,841	2,001,991	74,148	27	34.11
June	2,211,657	296,765	2,597,517	99,904	26	45.96
July	2,738,083	355,836	3,203,810	128,152	25	58.95
August	2,430,750	370,370	2,900,611	107,430	27	49.42
September	1,991,225	242,016	2,312,562	88,944	26	40.92
October	1,847,756	191,673	2,111,866	81,226	26	37.37
November	1,331,091	156,939	1,540,882	59,265	26	27.26
December	1,624,447	132,787	1,819,648	72,786	25	33.48
Twelve months..	19,665,101	2,428,734	22,878,571	73,801	310	33.95

Reported for 1934 by Companies Which Made 98.10 Per Cent of 1933 Ingot Output

1934						
January	1,786,467	172,489	1,996,897	73,959	27	34.13
February	*1,993,638	175,873	*2,211,530	*92,147	24	*42.53
March	2,540,143	203,904	2,797,194	103,600	27	47.81
April	2,622,372	257,482	2,935,631	117,425	25	54.19
Four months	8,942,620	809,748	9,941,252	96,517	103	44.54

The figures of "per cent of operation" are based on the annual capacity as of Dec. 31, 1932, of 67,386,130 gross tons for Bessemer and open-hearth steel ingots.
* Revised.



THE NEWS OF THE WEEK

Return of Pre-Code Era in Steel Would Hinder Recovery, Tower Warns

DESCRIBING the part played by the steel industry in the national recovery, Walter S. Tower, executive secretary of the American Iron and Steel Institute, in a nation-wide radio address on May 5, warned that any return to the destructive conditions that formerly prevailed in this industry might be fatal to the whole recovery effort. Mr. Tower said that since last June the steel industry has re-employed more than 80,000 people, has raised wages approximately 36 per cent, has eliminated unfair practices and price discriminations and has increased prices moderately to support the labor provisions of the code.

"In fairness to its employees and to its stockholders, the industry must earn a reasonable profit," Mr. Tower said. "If a profit is not earned, many steel companies will eventually go out of business and employees will lose their jobs.

"Since last June, over 80,000 people have been added to steel company payrolls. Furthermore, on April 1, a further addition in wages became effective throughout the industry, making a total advance in hourly wage rates since the code of approximately 36 per cent. The April 1 advances are adding approximately $36,000,000 annually to the industry's payrolls.

"Hourly wage rates in the steel industry are now from 6 to 7 per cent above the wage peak of 1929. Meanwhile, however, prices of steel products have not advanced nearly as rapidly as wages.

"Price increases have not been sufficient to put the industry upon a profitable basis as yet. This is a matter of some concern to the stockholders among whom the ownership of the iron and steel industry of the United States is divided.

"It is estimated that 11 leading producers of steel had a combined net loss in 1933 and 1932 of $180,000,000. This money was not lost by the men who run the mills. The steel mills are owned by their stockholders, 500,000 of them scattered all over the United States in all walks of life. Today the executives in the iron and steel companies are, in the main, only hired help exactly as workers in the mill are hired help. Executives, therefore, now possess a dual responsibility: first, that of maintaining satisfactory wages and a broad spread of employment among the workers, and, second, that of securing, when and if possible, a rate of earnings which will secure fair dividends for the stockholders."

Collective bargaining in the steel industry has been in effect in some plants for 15 years, Mr. Tower said.

"The great majority of workers are now participating in employee representation plans in their respective plants. Thousands of workers have utilized the facilities and benefits available under this method of collective bargaining."

A survey made by the American Iron and Steel Institute of employee representation plans during the first four months of operation under the steel code was pointed to by Mr. Tower as evidence of how these plans are meeting the problems arising in the day's work.

"There was actual collective bargaining between employees and management in thousands of cases considered, with the result that employees' requests were granted in 70 per cent of such cases."

Mr. Tower listed the major accomplishment of the steel industry under the code as the raising of the wage rates of nearly half a million people in spite of the fact that the industry as a whole is not yet able to earn any profits for its stockholders.

Detroit Company Orders Steckel Hot Strip Mill

THE McCLOUTH STEEL CORPN., Detroit, has placed an order with the Cold Metal Process Co., Youngstown, for a 20-in. reversing hot strip mill of the Steckel type. The installation will consist of a single stand roller bearing mill with pinch rolls on either side of the mill and hot coilers operating within furnaces. The main drive will consist of a 1500-hp. direct current reversing motor with motor generator set and auxiliary electric equipment for the coilers and pinch rolls. The mill will be suitable for rolling heavy slabs into strip up to 12 in. wide and in coils of 3000 lb.

The mill will be built by the Mackintosh-Hemphill Co., Pittsburgh. Construction work on the building will be completed in July and it is planned to place the unit in operation during September. Initial capacity will be 4000 tons monthly.

The Detroit installation is the third of this type to be inaugurated this year. The Youngstown Sheet & Tube Co. began such an installation earlier in the year at its Indiana Harbor, Ind., plant, which will roll hot strip up to 42 in. wide. Dominion Foundries & Steel, Ltd., Hamilton, Ont., concluded a licensing agreement with the Cold Metal company last year, but installation of a hot-rolling unit was delayed and did not get under way actively until recently.

The Continental Can Co., Inc., New York, has been licensed by the Cold Metal company to purchase and operate both hot and cold Steckel mills. As yet no capacity has been installed for the production of tin plate by the cold-rolling method.

British Steel Market Continues Active—Two Cruisers Placed

LONDON, ENGLAND, May 8 (*By Cable*).—British pig iron is active and the statistical position is strong. Deliveries are heavy and new orders are more plentiful, but not for forward delivery. Additional furnaces are being prepared for relighting. Exports are dull.

Semi-finished steelmakers are busy executing heavy contracts, but new business is quiet. Finished steel is very active for home account and exports are improving, particularly to Russia and South Africa. Rails, plates, sections and structural steel are in better demand.

The Admiralty has placed contracts for two 9000-ton cruisers. Export orders have been booked for locomotives and locomotive boilers. An international agreement on tin plate is reported to be imminent and higher prices are anticipated. Meanwhile export demand is improving, particularly from the Continent, Australia and South America.

The Continental iron and steel market is quiet, but new business in bars and plates is better. Expansion in Far Eastern business is expected in view of recent freight reductions but Japanese and American competition is severe. Despite recent price reductions, Manchurian business is no better, owing to Japanese price concessions. The Belgian market is quiet, but demand in Germany is steadily improving and works are busy.

British Prices, f.o.b. United Kingdom Ports

Per Gross Ton

Ferromanganese, export	£9
Billets, open-hrth.	£5 10s. to £5 15s.
Tin plate, per base box	17s. 3d. to 17s. 6d.
Steel bars, open-hearth	£7 17½s.
Beams, open-hrth.	£7 7½s.
Channels, open-hearth	£7 12½s.
Angles, open-hearth	£7 7½s.
Black sheets, No. 24 gage	£9 5s.
Galvanized sheets, No. 24 gage	£11 5s.

Official Continental Prices, f.o.b. Continental Ports

Per Metric Ton, Gold £

Current dollar equivalent is ascertained by multiplying gold pound price by 124.14 to obtain franc equivalent and then converting at present rate of dollar-franc exchange.

Billets, Thomas	£2 7s.
Wire rods, No. 5 B.W.G.	£4 10s.
Steel bars, merchant	£3 5s.
Sheet bars	£2 8s.
Flates, ¼ in. and up	£4
Plates, 3/16 in. and 5 mm.	£4 2s. 6d.
Sheets, ⅛ in.	£4 7s. 6d.
Beams, Thomas	£3 1s. 6d.
Angles (Basic)	£3 2s. 6d.
Hoops and strip steel over 6-in. base	£4 2s. 6d.
Wire, plain, No. 8	£5 7s. 6d.
Wire nails	£5 15s.
Wire, barbed, 4-pt. No. 10 B.W.G.	£8 15s.

Wisconsin Unemployment Insurance to Begin

THE Industrial Commission of Wisconsin has announced the official publication of finding of fact which will assure the collection of contributions to the Wisconsin unemployment insurance act beginning July 1, 1934. Under the terms of the act it could not become effective until specified gains in employment and payrolls had been achieved. The commission announces that the gains have now more than met the standards set by the legislature. The official publication, the commission said, marked the deadline for submission of voluntary plans by employers, the act providing that if sufficient voluntary plans covering at least 139,000 employees were approved by the commission the compulsory law would not become effective.

The commission says it has not yet determined whether or not enough voluntary plans have been submitted to reach the quota and that a definite finding will not be possible until late in May. However, only those plans approved before April 28 and established as five-year contracts by May 18 may lawfully be counted toward the quota. The commission expresses the opinion that it seems unlikely at this time that the quota can or will be reached and the act will doubtless take general and compulsory effect, with contributions beginning to accrue on July 1, 1934. Employers who desire to submit plans for exemption under the compulsory law will still be permitted to do so during the next few months, regardless of the quota, since official publication of the commission's index number finding of fact does not terminate the opportunity of employers to submit satisfactory voluntary plans for exemption under the compulsory law itself.

The Wisconsin unemployment insurance act is the only one of its kind in the United States and is serving as the model for the proposed national legislation in Congress. Employers of 10 or more workers for 18 or more weeks yearly are required to contribute to the fund. Employees receiving less than $1,500 yearly are eligible for benefits provided they have resided in Wisconsin two years or have been gainfully employed in the State 40 weeks in such two-year period prior to becoming unemployed. The employer's contribution under the compulsory feature of the act shall be 2 per cent of the total yearly payroll of such employees eligible for benefits. If contributions to the reserve have been made continously at this rate for two years and amount to $55 but less than $75 per employee, they may be reduced to 1 per cent yearly and may be discontinued when the reserve reaches $75 per employee and halted so long as it remains there.

Westinghouse Building Welded Boiler House

THE Westinghouse Electric & Mfg. Co. has begun construction of a boiler house for plant process and heating purposes at its East Pittsburgh works. An interesting feature will be the modern, entirely arc welded construction of the new building to house the boiler, which will be erected on the site of one of the present boiler plants. The present plans provide for the erection of a building with five of an ultimate eleven bays and the installation of one boiler at a total cost of about $400,000.

Electrochemists Elect New Officers

AT the recent annual meeting of the Electrochemical Society held at Asheville, N. C., the following new officers were elected: president, Dr. Hiram S. Lukens, University of Pennsylvania, Philadelphia; vice-presidents: R. L. Baldwin, Niagara Falls, N. Y., Alexander Lowy, Pittsburgh, G. W. Heise, Cleveland, James H. Critchett, New York; managers: L. R. Westbrook, Cleveland, Sherlock Swann, Jr., Urbana, Ill., J. J. Mulligan, East Orange, Ind.; treasurer, Robert M. Burns, 463 West Street, New York, and secretary, Colin G. Fink, Columbia University, New York.

The American Institute of Steel Construction, New York, has issued a revised edition of its "Manual of Steel Construction," a textbook and guide for structural engineers, architects and builders of bridges, buildings and other structures in steel. It was compiled under the direction of the technical staff of the institute and is issued at $2.

The business of the Black & Decker Mfg. Co., Towson, Md., has shown a progressive increase in each of the six months since Oct. 1, 1933. Net earnings for the six months, after all deductions for depreciation, Federal taxes, interest and all reserves amounted to $110,671.

German Steel Industry Again on Profitable Basis—Workmen Benefit

HAMBURG, GERMANY, April 30 (*By Special Correspondence*). —The German steel industry is again operating on a profitable basis. At the end of March, production was at 58 per cent and in April between 60 and 62 per cent of capacity. Unfilled orders on hand are higher and shipments in March and April were greater than production.

During the last year steel production has risen from a quarterly average of 580,000 tons to 930,000 tons. The absolute certainty that strikes or lock-outs are made impossible has restored confidence in local trade and retail business. The industry was forced to abandon its own retail trade organization by which the workmen were getting supplies on credit and were animated to buy beyond their purchasing power. Wages, if working time is taken into consideration, are lower than one year ago, but as the price index has declined slightly, and the workmen get the benefit of paid holidays this is equalized. Workmen have been freed from the heavy burden of union fees. Hitherto the men paid to their Trade Unions up to 5 per cent of their monthly income. Now they pay to the German Labor Front 2½ per cent of their income, which amount, however, is used to give them entertainments and the possibility of traveling during the holidays.

Monthly contributions to the unemployment fund were reduced by one-third and contributions to the pension and sickness fund 15 per cent. The workmen get more free land near the industrial places and the "repatriation to the flat land movement" is bringing thousands of industrial workmen back to the country, particularly from such industries which by all possibilities will not be able in the future to employ again so many men as in the past.

Time for Accepting Rail Contracts Extended

COMMERCIAL resolutions Nos. 33 and 44 of the steel code were amended April 27, so as to permit mills to accept contracts for rails and track supplies, either from railroads or manufacturers of frogs, switches and other special track work, until June 1 for delivery by Aug. 31.

This is the second time these resolutions have been amended. On the first occasion, March 15, they were amended to extend the period for the acceptance of contracts from March 15 to April 15 and to extend the time of delivery from June 30 to Aug. 31.

Prize Winners Named In Bridge Competition

K. R. DARRAH, a student at Rensselaer Polytechnic Institute, Troy, N. Y., won first prize in the sixth annual bridge design competition held by the American Institute of Steel Construction. George Pistey, also a student at Rensselaer, won second prize. First honorable mention was given to David Hiat of New York University; second honorable mention to J. F. Nowak of Rensselaer, and third honorable mention to Albert R. Nozaki of the University of Illinois.

The problem was to design a steel tower for a small highway suspension bridge. In addition to giving the students certificates of award, the first prize this year carries a cash compensation of $100 and the second prize $50.

These awards were made from the ten best designs selected in a preliminary competition when 62 students from 24 colleges in the United States entered drawings. The jury of award consisted of Dr. D. B. Steinman, Leon S. Moisseiff, consulting engineers of New York; H. Van Buren Magonigle, H. T. Lindeberg, architects of New York, and B. F. Betts, editor of *American Architect*.

Zinc Institute Discusses Proposed Code

THE greater part of the convention of the American Zinc Institute, held last week in St. Louis, was devoted to a discussion of the code for the industry. W. A. Janssen, deputy administrator of the NRA, who is in charge of the lead and zinc codes, spoke, heard the views of the delegates on the code and answered questions about its operation. The industry is still without a code, although one of the first to sign the President's Reemployment Agreement. J. D. Conover, secretary of the institute, explained the terms of the code and the development of the agreement. He also reported progress in the better galvanizing campaign of the institute.

Forty-two mills are now operating in the Tri-State district of Missouri, Oklahoma and Kansas, centering about Joplin, Mo., compared with 12 at the low point in 1932, according to the report of M. D. Harbaugh, secretary of the Tri-State Lead and Zinc Ore Producers Association. In 1929, 114 mills were in operation. The price of ore gradually increased from the low of $16 a ton early in 1933 to $35 in July, and then tapered off as production increased, the average price for the year having been $26.90.

Ralph M. Roosevelt of New York was reelected president of the institute for his seventh term at the annual convention. H. S. Wardman, J. A. Robinson and J. O. Elton were elected vice-presidents; H. I. Young treasurer, and J. D. Conover secretary. Mr. Roosevelt was named chairman of the executive committee.

World Statistics of Iron and Steel

The 1933 edition of the "Statistics of the Iron and Steel Industries," published by the National Federation of Iron and Steel Manufacturers, Caxton House, Tothill Street, Westminster, S.W.1, London, England, for sale at 10s. 6d., has been published. Production figures are brought through 1933 for the principal producing nations, in the matter of pig iron, steel and ore, but for the lesser producing nations the compilation is not complete for 1933. In all, 36 countries are included in the 145 pages of tabulations, with particularly complete data, as natural, for the United Kingdom. The book also covers in detail the tariffs of different nations, this part of the volume taking about 90 pages.

Urges a Basic Map Of United States

To put the former CWA project supervised by the Coast and Geodetic Survey on a sound national basis for continuation, the American Engineering Council has prepared with the cooperation of the United States Geological Survey and Coast and Geodetic Survey a memorandum, outlining the needs, proposing a plan and recommending an appropriation of $20,000,000 to provide in two years what would normally take 10 to accomplish —a basic map of the United States. It is hoped that the funds will be provided from the Public Works' Administration bill for additional funds for the national recovery program. The project would provide employment for between 8000 and 10,000 men during the next two years on what is regarded as a constructive, essential government need, which underlies both public and private development.

The Institute of Scrap Iron and Steel added 28 new members during April, in addition to approximately 75 members who were accepted during February and March.

New Jersey Structural Steel Code Approved and Code Authority Organized

WHAT is believed to be the first State code for the structural steel and iron fabricating industry was approved by Governor Moore of New Jersey, and became effective on April 23. The code was sponsored by the Structural Steel and Ornamental Iron Association of N. J., Inc., with the guidance of Elias A. Kanter, Newark, as its legal counsel, and the association has issued the following information concerning it:

Numerous hearings were held before the State Administrator and before the Governor of New Jersey, due, in the main, to the opposition of a few fabricators who claimed that the proposed minimum wage scale of 50c. an hour for common labor was too high a minimum. At the suggestion of the governor, a conference was also held at the office of Elias A. Kanter, attended by the proponents and representatives of the opposition.

Code Authority Numbers Ten

All persons engaged in the structural steel and iron fabricating industry in the State of New Jersey, under the terms of the code, are subject to its provisions. The determination of the amount of minimum wages to be paid to journeymen iron workers is to be made by the code authority. The maximum number of hours of employment per week is 40 and not more than 8 hr. in any 24-hr. period, excepting for emergency work, etc.

The administration of the code is intrusted to seven members of the State association and three independent appointees of the governor. The members elected pursuant to the first provision are Charles Arny, Newton A. K. Bugbee, Charles V. Hesselbach, Chris Oltmer, Jr., Joseph Pilling, Amos H. Radcliffe and Maxwell Spiro. The members appointed by the governor are Col. Hugh A. Kelly, Thomas E. Lynch and John J. O'Neill.

Bids Must Show Overhead and Selling Expenses

One of the important provisions of the code is that the members of the industry are not permitted to take any work for less than the reasonably estimated price, so that destructive price cutting may be prevented. Each member of the industry is required to send a copy of his bid to the code authority with a copy of his summary main sheet showing how the bid was arrived at, and the names of low sub-contractor and supply bids. It is also required that all estimates must include overhead and general and selling expenses. These bids are subject to the consideration of the code authority and are treated as confidential. If any member of the industry estimates below the reasonably estimated price, he is deemed to be a violator of the code and subject to prosecution. The code authority is also empowered to fix minimum prices, and a schedule of standard terms of payment is included in the draft of the code. Copies of the code are available without charge.

Every member of the industry, desiring to receive the communications of the code authority, may receive same at the filing of written declaration showing that he is a member of the industry, his address, his willingness to comply, etc.

The first meeting of the code authority was held on April 26 in the Industrial Office Building, 1060 Broad Street, Newark, where the headquarters of the code authority have been established. The code authority elected the following officers: Amos H. Radcliffe, chairman; Col. Hugh A. Kelly, vice-chairman; Charles V. Hesselbach, treasurer; Simon Fein, secretary and code director. The detailed administration will be in charge of Mr. Fein. The code authority also designated Elias A. Kanter as its counsel.

Several committees were provided for, with the following chairmen: Charles V. Hesselbach, budget and finance; Charles Arny, labor; Chris Oltmer, Jr., code enforcement; Col. Hugh A. Kelly, research and statistics; Newton A. K. Bugbee, coordination and national cooperation.

The stated meetings of the code authority are scheduled to be held every Thursday morning, at 9.30, at the code authority headquarters.

20th Anniversary of Eclipse Counterbore Co.

MAY, 1934, marks the 20th anniversary of the Eclipse Counterbore Co., 7410-30 St. Aubin Avenue, Detroit.

R. G. Michell, general manager, who has been associated with the company since it was founded in 1914, regards the business outlook for the next few years, and particularly the next 12 months, as being highly encouraging for the metal cutting tool industry.

The Eclipse company has experienced several "depressions" and in each instance the "valley" or turning point upward has found manufacturing plants in the machinery and automotive industries with bare stockrooms and tool inventories reduced to the very minimum. Uncertainty as to the future invariably has delayed replenishment of these depleted stocks until so long after the actual turning point upward has taken place, that most cutting tool manufacturers then find themselves swamped with these long-delayed orders.

Production, especially in the automotive industry, is speeded up so very much faster than the time required to produce machinery and special tools that orders are again placed far in advance of actual daily requirements resulting in the assurance for many months, at least, that the metal cutting tool industry as a whole should enjoy an abundance of healthy business.

Since it was organized in 1914, the Eclipse company has expanded from an infant organization, renting a few feet of space, to a sizable and important company-owned plant occupying more than 25,000 sq. ft., with a capacity of upward of 200 employees.

To Discuss Code Operation At Institute Meeting

AT the general meeting of the American Iron and Steel Institute, to be held at the Hotel Commodore, New York, May 24, features of the morning session will be the address of the chairman of the institute, Charles M. Schwab, chairman, Bethlehem Steel Corpn., and an address on the operation of the iron and steel code by Walter S. Tower, executive secretary of the institute.

Three formal technical contributions are scheduled for the afternoon session, and there will be the usual banquet in the evening. The papers for the technical program are: "Progress and Outline of the Work of the Technical Committee," by L. S. Marsh, manager, department of metallurgy and inspection, Inland Steel Co., Chicago; "Progress in the Welding of Steel," by Everett Chapman, vice-president in charge of research, Lukenweld, Inc., Coatesville, Pa., and "Some Characteristics Common to Carbon Steel and Alloy Steels," by E. C. Bain, metallurgist, Research Laboratories, United States Steel Corpn., Kearny, N. J.

Pig Iron Output Up 10.2 Per Cent In April

PRODUCTION of coke pig iron in April totaled 1,726,851 gross tons, compared with 1,619,534 tons in March. The daily output in April, at 57,561 tons, showed a gain of 10.2 per cent over the March daily rate of 52,243 tons.

There were 110 furnaces in blast on May 1, making iron at the rate of 63,270 tons a day, compared with 96 furnaces on April 1, operating at the rate of 53,720 tons a day. Sixteen furnaces were blown in during April and two blown out or banked, making a net gain of 14 furnaces. The Steel Corporation blew in six furnaces, independent steel companies put in eight furnaces and merchant producers blew two in and took two off blast.

Among the furnaces blown in are the following: One Carrie, one Edgar Thomson furnace, Carnegie Steel Co.; one Monongahela, one Lorain, National Tube Co.; one Gary and one Chicago (new), of the Illinois Steel Co.; one Donner, one Haselton, Republic Steel Corpn.; one Cambria, Bethlehem Steel Co.; one Aliquippa and two Eliza furnaces, Jones & Laughlin Steel Corpn.; one Otis, Otis Steel Co.; one Toledo furnace, of Pickands, Mather & Co.; the Jisco furnace, of the Jackson Iron & Steel Co., and one Madeline furnace, of the Inland Steel Co.

Furnaces blown out or banked include the Niagara furnace, of the Tonawanda Iron Corpn., and the Hamilton furnace, of the Hamilton Coke & Iron Co.

Daily Average Production of Coke Pig Iron

Gross Tons

	1934	1933	1932	1931
January	39,201	18,348	31,380	55,299
February	45,131	19,798	33,251	60,950
March	52,243	17,484	31,201	65,556
April	57,561	20,787	28,430	67,317
May	.....	28,621	25,276	64,325
June	.....	42,166	20,935	54,621
½ year	.....	24,536	28,412	61,356
July	.....	57,821	18,461	47,201
August	.....	59,142	17,115	41,308
September	.....	50,742	19,753	38,964
October	.....	43,754	20,800	37,848
November	.....	36,174	21,042	36,782
December	.....	38,131	17,615	31,625
Year	.....	36,199	23,733	50,069

Production of Coke Pig Iron and Ferromanganese

Gross Tons

	Pig Iron*		Ferromanganese†	
	1934	1933	1934	1933
January	1,215,226	568,785	11,703	8,810
February	1,263 673	554,330	10,818	8,591
March	1,619,534	542,011	17,605	4,783
April	1,726,851	623,618	15,418	5,857
May	.....	887,252	.....	5,948
June	.....	1,265,007	.....	13,074
½ year	..	4,441,003	..	47,063
July	.....	1,792,452	..	18,661
August	..	1,833,394	.....	16,953
September	.....	1,522,257	.....	13,339
October	....	1,356,361	...	16,943
November	.....	1,085,239	.....	14,524
December	..	1,182,079	...	9,369
Year	.....	13,212,785	.....	136,852

*These totals do not include charcoal pig iron. The 1932 production of this iron was 15,055 gross tons.
†Included in pig iron figures.

Merchant Iron Made, Daily Rate

Tons

	1934	1933	1932
January	7,800	2,602	6,256
February	7,071	2,863	7,251
March	7,197	2,412	7,157
April	8,838	1,908	5,287
May	....	3,129	4,658
June	....	4,088	6,090
July	..	6,783	3,329
August	.....	7,756	3,070
September	..	10,034	3,213
October	....	8,634	4,286
November	..	7,639	4,435
December	....	8,358	3,674

Production by Districts and Coke Furnaces in Blast

Furnaces	Production (Gross Tons) April (30 Days)	Production (Gross Tons) March (31 Days)	May 1 Number in Blast	May 1 Operating Rate, Tons a Day	April 1 Number in Blast	April 1 Operating Rate, Tons a Day
New York:						
Buffalo	115,253	108,558	7	4,050	7	3,995
Other New York & Mass.	5,590	6,375	1	185	1	205
Pennsylvania:						
Lehigh Valley	34,898	34,326	3	1,165	3	1,105
Schuylkill Valley	11,074	11,029	1	370	1	355
Susquehanna and Lebanon Valleys	17,811	19,040	1	595	1	615
Ferromanganese	....	....	0	....	0	....
Pittsburgh District	336,633	270,628	21	12,690	15	8,655
Ferro. and Spiegel	4,225	4,136	1	140	1	135
Shenango Valley	31,546	33,019	2	1,050	2	1,065
Western Pennsylvania	52,544	43,539	4	1,965	3	1,920
Ferro. and Spiegel	11,193	7,958	1	375	1	295
Maryland	78,441	87,098	3	2,615	3	2,810
Wheeling District	129,570	114,552	7	4,320	7	3,950
Ohio:						
Mahoning Valley	178,930	171,277	9	6,425	8	5,525
Central and Northern	205,881	213,817	14	8,340	11	6,895
Southern	26,637	25,044	3	730	3	925
Illinois and Indiana	282,772	264,280	16	11,460	13	8,660
Mich. and Minn.	49,513	47,828	3	1,650	3	1,545
Colo., Mo. and Utah	20,477	19,269	2	685	2	620
The South:						
Virginia	....	....	0	....	0	....
Kentucky	11,272	12,741	1	375	1	410
Alabama	122,591	119,509	10	4,085	9	3,855
Ferromanganese	....	5,511	0	....	1	180
Tennessee	....	....	0	....	0	....
Total	1,726,851	1,619,534	110	63,270	96	53,720

New Deal Adds 60,000 To Federal Payrolls

THE total number of persons employed by the various New Deal agencies of the Federal Government was about 60,000 in February, 1934, according to an analysis of official figures published by the National Industrial Conference Board. In the same month the total number of Federal employees, within and outside of the District of Columbia, was 611,752, as compared with 578,231 at the end of June, 1932.

As classified by the conference board, the New Deal agencies include not only those governmental divisions that have been established since March, 1933, but also such agencies as the Interstate Commerce Commission, the Federal Trade Commission and the Reconstruction Finance Corporation, because their powers have been greatly enlarged by the various legislative acts passed since March, 1933.

... PERSONALS ...

ARTHUR H. SMITH, vice-president, Railroad Materials Corpn. for the past four years, has severed his connection with that company and has become affiliated with the Youngstown Sheet & Tube Co. as special representative in the railroad field in the East. He will make his headquarters in New York and cover the territory east of Youngstown. Mr. Smith is well known in steel and railroad circles, having been connected with railroad sales almost continually since 1912, when he joined the Railroad Supply Co. in New York. After two years' service in the army he returned to this company in 1919 as assistant to the vice-president.

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R. B. MILDON has been appointed vice-president in charge of the operations of marketing, engineering, manufacturing and service, relating to products of the South Philadelphia works of the Westinghouse Electric & Mfg. Co. Mr. Mildon was graduated from Cornell University in 1900, and soon afterward was employed by the Union Pacific Railroad and Colorado Fuel & Iron Co. in an engineering capacity. In 1906 he was appointed chief engineer of the Duquesne Mining Co., and in 1909 went with the Westinghouse company in charge of the gas producer department of the machine works at East Pittsburgh. In 1912 he was transferred to the Westinghouse Air Spring Co., reentering the employ of the Westinghouse Electric & Mfg. Co. in 1916 as assistant to the vice-president.

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GEORGE H. BUCHER has been elected president of the Westinghouse Electric International Co., with headquarters at East Pittsburgh. He has been associated with the Westinghouse organization for almost 25 years. After being graduated from Pratt's Institute, Brooklyn, Mr. Bucher became associated with the Westinghouse Electric & Mfg. Co. as a graduate student. In 1911 he was transferred to the export department at New York, and in 1920 was appointed assistant to the general manager of the Westinghouse Electric International Co. In 1921 he was made assistant general manager, and in 1932 he was appointed vice-president and general manager of the Westinghouse International organization.

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H. E. BRENCHLEY, of the Minneapolis Moline Power Implement Co., has been elected president of the Central Fabricators Association. R. D. Wood, of the Mississippi Valley Structural Steel Co., has been named vice-president and H. E. HUGHES, Continental Bridge Co., has been made secretary and treasurer.

A. H. SMITH

LEWIS D. MCCLAREN has been made manager of the foundry and industrial coke department of the Republic Coal & Coke Co., Chicago. Mr. McClaren was formerly resident manager of the Indiana Consumers Gas & By-Products Co., Chicago office.

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LIEUT. HARRY A. KUHN, chemical warfare service, United States Army, has been appointed administration member, without vote, of the supervising agency for the oxyacetylene industry.

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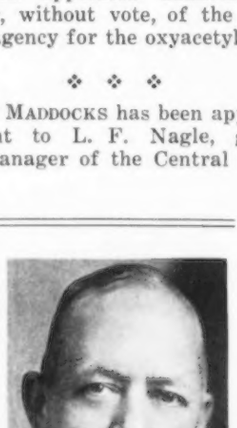
R. H. MADDOCKS has been appointed assistant to L. F. Nagle, general sales manager of the Central Iron & Steel Co., Harrisburg, Pa., and R. S. MADDOCKS has been made New York district sales manager. Headquarters for both will be in the Cunard Building, New York.



G. Walter Sanborn, who has been elected vice-president in charge of purchases and traffic of the United Engineering & Foundry Co., Pittsburgh, as announced in this column last week.

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CHARLES ALAN BRANTINGHAM, Thompson & Lichtner Co., Inc., engineer, Chicago, has been appointed administration member of the code authority for the machine knife and allied steel products industry.

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W. J. SULLIVAN, formerly secretary to the president of the United States Steel Corpn., has been appointed vice-president and sales manager of the Ryan Metallic Packing Co., Chicago, with a New York address for the present of Box 211, Trinity Station.

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LAWRENCE E. CONNELLY has been appointed administration member of the code authority for the foundry equipment industry. Mr. Connelly was vice-president of the D. Connelly Boiler Co., Cleveland, from 1900 to 1931. In the latter year the business was sold to the Foster Wheel Corpn., and Mr. Connelly retired from active business.

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N. E. DAUB, formerly associated with the Atlantic Foundry Co. and the Adamson Machine Co., Akron, Ohio, has been appointed resident sales representative, at Akron, for the Massillon Steel Casting Co., Massillon, Ohio.

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EDGAR N. DOLLIN, formerly president of the Allied Die Casting and Acme Die Casting corporations, has been appointed manager of the American Type Founders die casting division, Jersey City, N. J., which will be expanded to take in all forms of commercial die casting. Mr. Dollin has been actively connected with the die casting industry since 1912.

"High Temperature Insulation" is the title of a lecture prepared by the Johns-Manville engineering department, and used each year by schools of mechanical, chemical, metallurgical and ceramic engineering. The lecture comprises a short review of the principles of heat transfer; a discussion of the theory and practice of conductivity values of insulation and refractories; insulation in boilers, kilns, oil stills, furnaces, regenerators and other typical industrial equipment operated at high temperatures. A standard formula for heat transfer by conduction and description of a method of determining heat flow through furnace walls are also included. Reprints in the form of 32-page 6 x 9-in. pamphlets have been published for general distribution by Johns-Manville, 22 East Fortieth Street, New York.

THIS WEEK IN WASHINGTON

United States Chamber Reviews New Deal

Approves Codes of Fair Competition But Assails Financial Legislation— Proposed Tariff Act Desirable If Modified

By L. W. MOFFETT
Resident Washington Editor, The Iron Age

WASHINGTON, May 8.—Attended by some 1400 delegates, the twenty-second annual meeting of the Chamber of Commerce of the United States came to a close last Friday with the adoption of 26 resolutions and the election for the third time of Henry I. Harriman as its president.

Devoted principally to an appraisal of the New Deal, the tone of the conference at times was sharply critical, and brought from President Roosevelt a pointed suggestion that business should stop crying "wolf." Warning was sounded by the Chief Executive against arousing false fears and destroying confidence in the administration program. Whether or not, as reported, the resolutions were drafted before the President's message was received, they did not carry a strain of alarm, though they were on the whole rather strongly worded. Discussions at the group meeting were much less mild. While the NRA came in for a great amount of criticism, mixed with praise, the resolutions themselves did not pass upon this or any of the other numerous alphabetical groups under governmental aegis.

Surveyed in its entirety, the tenor of the conference appeared to be that emergency conditions necessitated a great deal of governmental regulations and that business had made headway under it. But with the passing of the emergency, there was also the thought that much governmental regulation should be lifted and business permitted to proceed under its own to a greater extent. Continuance of features of the Government program likewise was urged, coming from President Harriman and others.

Certain forms of legislation were condemned unsparingly at group meetings. This was especially true of the securities act of 1933, the proposed Fletcher-Rayburn stock exchange bill and proposed silver and inflationary legislation. Durable goods and financial representatives particularly assailed the securities and stock exchange acts, and while modifications in these measures were announced almost simultaneously with the adoption of the Chamber resolutions, they still fall far short of what industry and finance consider necessary to restore confidence so necessary to business recovery.

Tariff Bill Endorsed

The administration reciprocal tariff bill was endorsed now that it has been amended to permit interested industries to be heard before duty changes are made. The suggestion that the measure be amended in this direction was made by James A. Farrell, former president of the United States Steel Corpn., in a paper he presented at one of the group meetings. The resolution also suggested that the bill be supplemented with a provision assuring domestic industries that they will not be placed at disadvantage in their home market, a sweeping and complicated proposal, obviously sound but one which sets up an obstacle in handling reciprocal tariffs.

One of the highlights of the meeting was a statement by General Hugh S. Johnson before the American Trade Association executives that the NRA could not be enforced with penalties and policemen. It reflected a sharp shift from former statements by the administrator that smacked of the "crack down" policy. That the General resented criticism of NRA at the Chamber conference appeared clear from the flailing attack he made on NRA critics at Columbus, Ohio, a bare half-day after the Chamber meeting had adjourned.

He struck back personally at President Harriman and referred to the Chamber as "the very citadel of Old Deal propaganda." This latter reference to propaganda was not without its humor when the General himself, in addressing the trade association, admitted a "campaign" soon will be started to revive interest in the NRA.

Holds Codes Essential

Henry I. Harriman, president of the Chamber, in opening the conference said that he was sure that in basic industries codes of fair practice are essential, that the chaos of unbridled competition cannot be permitted to return and that some Federal agencies cooperating with business must continue to carry out the major functions exercised by NRA and AAA. Mr. Harriman said this did not mean a regime of bureaucratic control but rather a regime of orderly economic freedom in which the industries themselves play their responsible part.

Notice was taken by both Mr. Harriman and A. W. Robertson, chairman, Westinghouse Electric & Mfg. Co., of the criticism directed at business. Both rallied to its defense. Mr. Harriman

said there have been abuses but declared that business cannot be judged solely by "these any more than the merits of civilization can be weighed by its jails and prisons."

Mr. Robertson declared that a study of the basic quality of all enduring business will disclose that it is based on integrity.

"The fact is," he declared, "that honesty is so much a part of business that an honest business man is not first or even tenth page news. It is the dishonest man who gets into the papers, attracts attention and sometimes makes the unthinking person blame the 90 per cent or more who are honest for the 10 per cent or less who are not."

He declared that a planned economy is undoubtedly necessary.

"In a sense we have always had a planned economy but we need better plans, not more plans," said Mr. Robertson. "Human plans have to be run by average men. It makes no difference whether they are Utopian or otherwise and just how a Utopian plan can be run by a far from Utopian average man I have never discovered."

Securities Act Assailed

The opening attack on the stock exchange bill and the securities act was made by George H. Houston, president, Baldwin Locomotive Works, and B. A. Tompkins, vice-president, the Bankers' Trust Co., New York. They insisted that unless this legislation is greatly amended to produce a freer flow of credit through private enterprise the durable goods industries cannot recover. These views were expressed at the session on "Progress and Problems in Capital Financing," and also emphasized before the group on "Progress and Problems in the Capital Goods Industries" by Malcolm Muir, president, McGraw-Hill Publishing Co., New York; Ralph E. Flanders, president, Jones & Lamson Machine Co., Springfield, Vt.; Nick Helmers, vice-president, Siems-Helmers, Inc., and president, Associated General Contractors of America, Inc., and Stephen Voorhees, Voorhees, Gmelin & Walker, New York, who is also chairman of the construction code authority. Mr. Flanders' address was published in THE IRON AGE of May 3, pages 29-30.

Mr. Houston pointed out that about half of all unemployment is in the durable goods industries and that a great part of the remainder in the service industries and in the consumption goods industries is attributable directly to the lack of production and employment in the producer goods group. He said that it has been recognized that all of the physical facilities of the world must be rebuilt about every 20 years and that the cessation of such rebuilding operations during an extended period of depression always has resulted in a very large backlog of dormant demand for such facilities which was converted into the actual demand by the speculative enterprise of forward looking people as soon as the forces creating such depression had spent themselves and recovery became apparent. It is believed, he said, that these same principles will apply in the present depression and that reemployment from now on will depend largely upon the creation of conditions essential to such forward looking entrprises, and upon the provision of a readily available and adequate supply of capital and credit at sufficiently low cost to stimulate such speculative undertakings.

In the course of reciting statistical surveys, Mr. Houston showed that, exclusive of financing for investment trusts, trading and holding companies and similar undertakings, the flow of new capital into private enterprise during the decade of the 20's amounted to about $3,425,000,000 per year. This dropped precipitately to only $160,000,000 in 1933. He said that the deficiency accumulated during the depression in the normal flow of new capital into private business has been estimated in various ways and amounts, but that in any event it amounts to several billion dollars. In addition he mentioned the large shrinkage since 1930 in the capital resources of business as is evidenced by a comparison between the national income produced and that paid out during this period. It was estimated that in 1933 the income paid out was in the neighborhood of $10,000,000,000 in excess of the income produced, indicating a shrinkage of about $33,000,000,000 in the capital resources of American business since 1929.

There are many instances, Mr. Houston said, in which corporate resources have been so diminished that normal operation of such enterprises is out of the question without replenishment of capital. He stated that he received a message a few weeks ago from the code authority of the automotive parts industry that it could use advantageously $100,000,000 of new facilities if they could be financed. A similar statement was made a few days later by the code authority of the textile industry. The housing shortage alone was declared to be sufficient to absorb a large amount of capital annually for a long period of time.

Investors Lack Confidence

Capital does not move into private enterprise, benefiting employment thereby, because of lack of confidence on the part of the investors in the conditions under which American business must be conducted and because of "certain specific obstructions that lie across the channel through which corporations must procure their capital requirements.

"As to the first," said Mr. Houston, "the remaining causes for lack of confidence can be quickly removed by a clear, unmistakable expression on the part of the Government—

"(a) To encourage the profit motive in business

"(b) Not to interfere with business through further regulation and

"(c) To balance the budget as soon as possible and cease to compete in the capital markets with private enterprise through a constantly expanding Government debt. A balanced budget will also end any feeling of uncertainty with respect to monetary stability.

"As to the second, the securities act of 1933 is the chief barrier that must be dealt with. It provides, as we all know, for far-reaching and burdensome regulation of business in the issuance and offering of its securities for sale. This regulation carries with it extensive but uncertain liabilities for officers, directors, stockholders and technical advisers participating in such offerings."

He said that industry believes it would be advisable to err at this time on the side of under-regulation rather than over-regulation and that it is better possibly to let a few issues of securities drop out of the national exchanges than to place the burden of governmental regulation of 450,000 corporations upon all the small enterprises of the country.

One remaining obstacle, the banking act of 1933, prohibits the investment in, or underwriting of, securities by a national bank after June 16, 1934, Mr. Houston stated. This provision, if carried out, will deprive the country of existing banking facilities at a time when every effort should be concentrated upon increasing the movement of private capital into private enterprise. He explained that it is suggested that without sacrifice of banking, this separation might well be deferred for a further period to give an opportunity to the investment bankers of the country to reorganize their business in a sound and effective manner before depriving industry of the use of existing facilities for procurement of capital.

Bogey of Over-Production

Although sharing the view of Mr. Flanders that there is no over-production, Malcolm Muir explained that it was one of several bogeys that have to be killed by educational work in connection with capital goods investments today. Mr. Muir named the killing of these bogeys and educational work as two requisites for recovery and coupled with them general public confidence, which was said to be far below par, due to the world-wide depression and more specifically to the 1933 securities act and the proposed stock exchange legislation.

Dealing with the over-production bogey, Mr. Muir said there are definite statistics available to show there is no over-production in either capital

or consumer goods. He cited a statement that there was no serious overproduction of durable and capital goods just before the depression, but that serious shortages have developed during the depression. The bogey of over-production ignores the existence of a new economic order today, of obsolescence and the fact that a high-cost plant under controlled competition will meet a sure death if not a sudden one. He said he was inclined to think they will come together. Another bogey that must go, he said, is the idea that profit, per se, is wrong. Profits, for management and labor alike, keep the standards of living high and the demand for goods active. He also said it was a popular misconception that markets for various products are saturated.

Tariff Adjustments Should Be Limited

Having regard to the sharp differences of opinion among administrative officials and the leaning of some toward a horizontal lowering of tariff rates, it is felt in business circles that the principles underlying our tariff and the limits within which rate adjustments shall be made should be clearly defined by Congress.

This view was expressed by James A. Farrell, former president of the United States Steel Corpn., and chairman of the National Foreign Trade Council, who presided as chairman of the conference of American chambers of commerce and foreign trade bureaus in the United States. Mr. Farrell restated recommendations for amendment to the pending administration reciprocal tariff bill which he made some time ago before the House Committee on Ways and Means on behalf of the Chamber of Commerce of the United States. Three changes, he said, are regarded as essential: That the flexible provisions of the present tariff act be maintained; that no rate be lowered to a point where American industry and agriculture shall be subjected to destructive foreign competition and that the flexible provisions which the President has agreed to maintain should embody a basic controlling formula defined by Congress. This, Mr. Farrell declared, should provide for an adequate protective level for determining individual rates. Recommendation also was made for the establishment of a Tariff Adjustment Board or other instrumentality in the capacity of a board advisory to the President, which would act also as a clearing house for the views of affected industries.

Sale of Textile Machinery Not Hampered

The machine hour limitation provision in the code for the cotton textile industry has by no means operated to curtail the production and sale of cotton mill machinery, according to B. P. Gossett, president, Chadwick Hoskins Co., Charlotte, N. C. On the contrary, he told the round table group on Progress and Problems in the Manufacturing Industries, the more stable condition in the textile industry has noticeably stimulated business in cotton mill machinery through expenditures undertaken to provide replacements, to balance operations and to increase efficiency. With cost of production of cotton goods greatly increased, said Mr. Gossett, there is real incentive to effect economies in every possible way, and one definite opportunity for reduction in cost can be found in the replacement of old machinery with new and more effective types. He pointed out that there is no restriction whatever on preparatory machinery and other important equipment.

Mr. Gossett referred to a recent survey completed by the cotton textile code authority which shows a potential outlay of $100,000,000 for capital goods equipment by the textile industry during the next 18 months. Of the total potential expenditure, he stated, nearly $14,000,000 represents commitments already entered into for replacements of machinery. Of the balance, it was explained, 60 per cent would be spent for manufacturing equipment, 25 per cent for manufacturing plant construction and other construction, including houses, power buildings, warehouses, transmission lines, etc., and the remainder for auxiliary machinery, such as power generators, elevators, trucks, tractors and other repair or replacement projects. He said these expenditures can be directly attributed to the control of over-capacity "which has had a stimulating influence on our industry."

Good in NRA Will Live

Addressing the American Trade Association Executives, General Hugh S. Johnson said that if there is any good demonstrated by the recovery act it will live. If there is anything bad in it it will die, he added. This was said in reply to a query as to whether industry should plan for operation as it now does after NRA expires, June 16, 1935. This is almost identical with what the General said nearly one year ago when be boldly started upon the thorny and untrodden path whose goal was the regimentation of industry.

The General spoke of a campaign to be started in 30 or 60 days when the code eagle is to be introduced. It is clear that the campaign will be the vehicle used in an attempt to revive interest in NRA. General Johnson acknowledged that "now that Congress is nearing adjournment and everybody wants something, there are almost as many people in town as there were a year ago."

He told the trade association executives that he did not believe business would like to have the recovery act expire until permanent legislation carrying out its general purposes shall have been enacted. He declared that, "we all believe that we need a method of economic planning and we can't have planning without some way to administer the plan." He further predicted that part of the recovery act would become permanent, though he would not predict what part.

In striking contrast to his rugged declaration at the recent meeting of code authorities in speaking of compliance that "You ain't seen nothin' yet," the General told the audience that "We can't enforce this law with penalties and policemen. It can be enforced only if people want it." He again stated he was willing to let the licensing provision of the recovery act expire June 16, this year, but that he did not know the attitude of the President on the matter. Asked about price policies, he said he always thought that open price posting was the proper system; that Government fixing of profits was dangerous and that posted prices should prevent selling below cost. He added that there are some emergencies in which the Government should fix prices.

Warns of Mounting Debt

The rising avalanche of Federal debt was the source of warning sounded by Fred H. Claussen, president, VanBrunt Mfg. Co., Horicon, Wis. He pointed out that when reduced receipts and increased expenditures will double the national debt in five years with a total of $32,000,000,000 as compared with $16,000,000,000 in 1930, "surely the most complacent of us will realize that such a condition means something." Mr. Claussen presented a careful study of Federal, State and local government expenditures and taxes and told of the "new crops" of revenues sought by the Federal Government. He said that "we are just beginning to find out that the immense sums appropriated with such apparent ease and unconcern are piling up a load that will bear on the backs of man, woman and child even unto future generations."

He declared that defeat of initiative and repression of courage come to the industrialist when the impost against any possible earnings is out of proportion when measured by the risk taken. He said that almost every conceivable type of tax imposition has been used and predicted that necessity will force general use of the sales tax when other means fail.

"I had thought that almost every expedient had been tried except direct property taxes reserved to States and their subdivisions," said Mr. Claussen. "But a new idea has been advanced by Senator Wagner and his friends that it would be an expedient thing to levy an excise tax of 5 per cent on every dollar of wage to be paid by the employer to the Government, whenever he feels able to find work for an employee in his industry."

Mr. Claussen said that "it is safe to predict that the American people

and the courts of this land will not countenance any such legislative skullduggery." This tremendous imposition of 5 per cent on the payrolls of all employers, it was declared, will be just another millstone around the neck of industry and commerce. Men in high positions have stated that the nation can carry its projected national debt of $32,000,000,000 without serious concern. When this statement is made, he pointed out, no account is taken of the long-term obligations of States, counties and cities, real estate mortgage loans, debts of railroads, utilities and like obligations of corporations which comprise a grand total of $130,000,000,000, or one-half of the estimated national wealth.

Becomes Chairman of Industrial Advisory Board

WASHINGTON, May 8.—The NRA's Industrial Advisory Board has elected George H. Mead, president Mead Paper Corpn., Dayton, Ohio, chairman, to succeed Henry S. Dennison, whose term has expired. Simultaneously, announcement was made of the appointment of Col. Arthur W. Little, chairman, J. J. Little & Ives Co., New York, to fill one of the vacancies caused by the retirement of Mr. Dennison, and of H. P. Kendall, president, Kendall Co., Boston, and Thomas J. Watson, president, International Business Machine Corpn., New York, whose terms have expired.

Pending the appointments of two additional members, the 13 members now comprising the board include the following: George H. Mead (Chairman), president, Mead Corpn., Dayton, Ohio; M. L. Benedum, president, Benedum Trees Oil Co., Pittsburgh; F. B. Davis, Jr., president, United States Rubber Co., New York; Joseph H. Dryer, president, National Council of Traveling Salesmen's Associations, New York; Col. Robert G. Elbert, president, Oakbourne Corpn., New York; Lew Hahn, New York; de Lancey Kountze, chairman, DeVoe & Reynolds Co., New York; Col. Arthur W. Little, chairman, J. J. Little & Ives Co., New York; James H. Rand, Jr., president, Remington Rand, Inc., New York; John J. Raskob, New York; Robert Douglas Stuart, vice-president, Quaker Oats Co., Chicago, Ill.; Sidney J. Weinberg, partner, Goldman Sachs & Co., New York, and William E. Woodward, New York.

Demand Increasing for Fabricated Stainless

CONTRACTS totaling over $1,000,000 have just been closed by the Hi-Tensile Division of the Edward G. Budd Mfg. Co., Philadelphia. This division fabricates stainless steel in the naval, automotive and railroad fields. Ten days ago it delivered the streamlined, high speed "Zephyr" to its new owner, the Burlington Railroad.

Company Union Members Barred From Industrial Relations Boards

WASHINGTON, May 8.—Affected industries themselves appear to have been entirely disregarded in the terms of "peace" said to have been reached between General Hugh S. Johnson and the Labor Advisory Board over the disputed point of selecting labor representatives on industrial relations boards. Headed by President William Green of the American Federation of Labor, in the absence of Chairman Leo Wolman, the Labor Advisory Board, top-heavy with organized labor members, has laid down the principle that under no circumstance will a company union representative be named. This ultimatum, in the face of growing protests from industrialists of attempted organized labor domination in setting up such boards, is looked upon as bringing still nearer a showdown over the question.

Administrator Johnson is said to have agreed that the Labor Advisory Board shall name all labor representatives on industrial boards, which are being set up under each code where none had been previously established. Where industry does not have an American Federation of Labor organization, the labor board has "conceded" the point of selecting impartial outsiders rather than Federation officials. But it has served notice that it will not in any circumstance nominate company union representatives to any such board, even if the industry concerned is solid with company unions. This ruling comes from an organization which has insisted on majority representation as having the right to speak for all employees of a plant. It has, however, hedged on the principle before where it found itself in the minority, so its attitude of inconsistency is not entirely new.

General Johnson Not Pledged

General Johnson did not pledge himself to accept any of the board's nominations, but in the event of his failure to accept them the board still has the power to supply additional nominees. The right for General Johnson to do so is not granted. Since the board thus has a continuing power, there are those who feel that the General is compelled to accept the board's nominees. Industrialists are reported to have served notice that they have decisive opinions on the subject themselves and do not propose to submit to the dictatorial power that the board is seeking to assume.

The difference between the board and General Johnson arose originally because the administrator, sharing a widespread view, feared that if the board were given the right to name the labor representatives the industrial relations board would be packed with representatives of the American Federation of Labor. There are many who still think that will be the result even under the "peace" terms agreed upon between General Johnson and the board if allowed to proceed without interference by interested industries.

General Johnson often has been criticized by organized labor. He has repeatedly insisted that a company union is illegal if, as he said in his Columbus, Ohio, speech, it suffers the slightest interference from management in formation, organization or administration. But, as he stated also in that speech, "if NRA had completely achieved an ideal, we should see the employers of each industry organized under a code and the employees of each industry organized in an industrial union. Bargaining would be collective between the management and representatives of employees of each company."

Thus arises organized labor's charge that the General is a "company union" protagonist. Ridiculous as the charge is, it is certain that his views on labor are far different from those of the American Federation of Labor. This difference promises yet to plague the "peace terms" between the board and General Johnson. More so, it seems clear it will bring forth sharp opposition from many industries which do not have organized labor representation or have it only to a minor degree.

ICC Suspends Scrap Freight Changes

WASHINGTON, May 8.—The Interstate Commerce Commission has suspended until Dec. 1 schedules which propose to both increase and decrease rates on scrap iron and steel from Richmond, Va., to points principally in central territory. Rates from Richmond to Butler, Pa., and Steubenville, Ohio, would be increased from $5.60 and $5.80, respectively, per gross ton to $6.17.

The commission at the same time suspended to Dec. 1 schedules proposing both increases and decreases in rates on coke, coke breeze, coke dust and coke screenings from the Birmingham district and Chattanooga, Tenn., to central and Illinois territories. Illustrative of proposed and present rates in net tons are the following:

	From Birmingham		From Chattanooga	
To	Proposed	Present	Proposed	Present
Detroit	$5.00	$4.65	$4.55	$3.65
Springfield, Ill.	4.35	4.30	4.15	4.30
Kokomo, Ind...	4.35	4.30	4.15	3.91

PWA Loans to Railroads Total Nearly $200,000,000—30 Million for Rails

WASHINGTON, May 8.—Loans to railroads by the Public Works Administration aggregate $199,607,800, of which $30,395,456 was for the purchase of rails and fastenings, according to an announcement by Administrator Ickes. The largest single railroad loan was $77,000,000 made to the Pennsylvania Railroad for electrification. He stated that construction representing an outlay of more than $1,250,000,000 of PWA's $3,300,000,000 fund had been awarded by contract or begun by day labor.

At the close of April a checkup showed that $1,132,737,045 had been allotted by legislative act, executive order and special allotment. Most of contracts awarded and work begun was on the basis of allotments for Federal and non-Federal projects which amounted to $2,160,459,143. Twenty-two hundred contracts had been prepared in the Washington office and sent out to recipients of allotments. More than 1500 contracts covering non-Federal allotments had been executed by both the Administrator and the non-Federal body to which the allotment was made. Because of the large number of changes in allotments recently, Mr. Ickes announced a complete list of allotments as of April 30.

Loans to railroads are shown in the accompanying table.

PWA LOANS TO RAILROADS

Railroad Companies — Rails and fastenings	$30,395,456
New York-Washington, Pennsylvania Railroad—Equipment and electrification	77,000,000
Lehigh & New England — New freight cars	1,212,000
New York, New Haven & Hartford—Equipment	5,800,000
Northern Pacific—Locomotives	1,220,000
Chesapeake & Ohio—Gondola cars	16,876,000
Erie Railroad—New equipment	11,905,000
New York, Chicago & St. Louis —New equipment	5,028,000
Boston & Maine—New equipment and repairs	5,500,000
Central of Georgia—New equipment	600,000
Interstate Railroad—Improvements	250,000
Receivers Wabash—Improvements	916,294
Baltimore & Ohio—New equipment	4,230,000
Southern Pacific—Improvements	9,336,095
Illinois Central—Improvements	8,810,955
Midland Continental—Equipment	40,000
Lehigh Valley—Equipment	2,600,000
Delaware, Lackawanna & Western —Equipment	4,666,000
Pittsburgh & West Virginia — Equipment	331,000
Gulf, Mobile & Northern—Equipment	1,000,000
Chicago, Milwaukee, St. Paul & Pacific — Equipment and improvements	1,966,000
New York Central—Labor cost on new rails	400,000
Receivers, Fort Smith & Western —Improvements	75,000
Great Northern—Improvements	4,480,000
Receivers, Savannah & Atlanta— New equipment	250,000
Chicago Great Western — Equipment	1,200,000
Maine Central	20,000
Escanaba, Iron Mountain & Western—Concrete dock	3,500,000
Total, railroad loans	$199,607,800

Business Planning Group Schedules June Meeting

WASHINGTON, May 8. — The Business Advisory and Planning Council of the Department of Commerce is continuing its studies through sub-committees on decentralization of industry, unfair trade practices, waste in production and distribution, labor-saving machinery, foreign trade, industrial relations and long-term planning and reports on these studies will be made for the consideration and action of the council at a general meeting June 28. In making this announcement at the conclusion of a two-day session of the council, Secretary of Commerce Roper said one meeting of the executive committee will be held before June 28 at the call of the chairman. At this executive committee meeting and the next general meeting of the council, the latter's program will be formulated for the following year with particular reference to the activities of the Department of Commerce and the general economic problems pertaining to continuing phases of the recovery program.

Gerard Swope, retiring chairman of the council, announced the following slate of new officers: S. Clay Williams, Reynolds Tobacco Co., chairman of council and executive committee to serve one year; H. P. Kendall, Kendall Co., Boston, first vice-chairman to serve for nine months; George H. Mead, Mead Corpn., Dayton, Ohio, second vice-chairman to serve for nine months; W. Averill Harriman, National Recovery Administration, third vice-chairman to serve one year.

Iron Mines Closed by Strike at Birmingham

BIRMINGHAM, May 8.—All iron mines in the Birmingham district were closed Friday, May 4, when a strike was called by the International Union of Mine, Mill and Smelter Workers as a result of demands for increased wages, union recognition, etc. The strike had been voted two weeks previously and was expected by the furnace companies. Large stocks of ore have been assembled by the various companies and are large enough to insure normal operations for four to six weeks.

The union claims that the walkout will embrace about 8000 men, but actually the total is only about half that number. No attempt was made last week to continue mining. The ore mines affected are those of the Tennessee Coal, Iron & Railroad Co., Woodward Iron Co., Sloss-Sheffield Steel & Iron Co., and the Republic Steel Corpn. Gulf States Steel Co. is not affected, as it has not run its ore mine for two years.

This is the third strike in recent weeks to affect the iron and steel industry in this district. Throughout most of April the coal mining industry was tied up by a strike, and the return to normal has been slow. It was only last week that the mines of the Tennessee company were reopened.

Employees at the furnace plant of the Republic Steel Corpn. have been out on a strike since April 25. Furnace operations have been continued without a change, except for three days when one of the two active furnaces was banked. Both are now on regular schedules. The union has appealed to the Atlanta Regional Labor Board and a hearing was held last Friday. This strike has not touched the other furnace companies, as it concerns a company election held April 20.

Trade Notes

American Sales Co., Cincinnati, recently organized by M. Hirschberg, H. Muster and L. Hirschberg to liquidate surplus stocks of steel and machinery, has established an office and warehouse at 1935 Western Avenue.

Foster Wheeler Corpn., New York, has taken over exclusive rights for sale and manufacture of Ruths steam storage systems in the United States and Canada. Ruths accumulators will complement present line of Foster Wheeler power plant equipment. G. M. Cameron, formerly manager of Ruths Steam Storage Co., will be manager of the Ruths Accumulator Division of Foster Wheeler.

Carpenter Steel Co., Reading, Pa., has arranged for distributer's franchise with Horace T. Potts Co., Philadelphia, to distribute products of Carpenter's welded alloy tube division, located at 347 Madison Avenue, New York. These products, consisting primarily of welded tubing made of stainless steel, will be handled by Potts company through eastern Pennsylvania, southern New Jersey, Delaware and part of Maryland.

Foote Brothers Gear & Machine Co., Chicago, has appointed the following territorial sales representatives: F. A. Emmons, Jr., to one of the new Chicago territories; A. C. Hanson, New Buffalo, Mich., for northern half of Indiana with the exception of Lake County; J. H. Nicholson, 6315 North Thirty-third St., Omaha, Neb., for all of Nebraska and the two western lines of counties in Iowa; John M. Davis, United States National Bank Building, Denver, Colo., in Colorado and Wyoming; S. D. Calloway, 3029 Roanoke Road, Kansas City, Mo., in Kansas, and R. K. Plummer, 4015 Navahoe Road, Cleveland, replacing C. W. Frizzelle, as direct factory representative in northern half of Ohio.

Screw Machine Products Code Is Approved—Hearings Held and Scheduled

WASHINGTON, May 8.—General Hugh S. Johnson has approved the code for the screw machine products industry with the proviso that the schedule (A) which sets forth that a cost-estimating formula be suspended for 60 days in order that objections to it may be heard. Further provision was made for deletion of two clauses in Article V, one of which forbids making contracts for sale at specified prices for more than three months, and another which forbids accepting orders for deliveries extending four months from the date of orders. The industry is a division of the fabricated metal products manufacturing and metal finishing and metal coating industry. The supplementary code provides for a divisional code authority of seven members, and sets up standards of fair practices and standard terms and conditions of sale.

A subdivision of the approved machinery and allied products code, approval has been given of the code for the locomotive manufacturing industry. In announcing approval of the code, the NRA said the industry suffered a 95.8 per cent reduction in production, a 72.6 per cent reduction in employment and a 90 per cent reduction in payrolls between 1929 and 1933, but expects a marked increase in 1934 due to the purchase of locomotives with PWA funds. It is estimated the code will increase factory employment about 4 per cent over June, 1933, and 9 per cent over what is generally considered normalcy in the industry. Factory payrolls, it is estimated, will increase 1.4 per cent over June, 1933, and office payrolls about 6.4 per cent. Wage, hour and labor provisions of the basic code are accepted, and a temporary code authority to function not more than 60 days is set up to provide for an election of a permanent body consisting of not more than three members exclusive of administration members to serve without expense to the industry. Provision is made for the industry to withdraw from the basic code upon a two-thirds vote of all members of the industry.

Bank Vault Code Approved

The code for the bank and security vault manufacturing industry, approved last week by General Johnson, provides for a code authority of five members to be chosen by the industry at an election to be supervised by the Association of Bank and Security Vault Manufacturers of America and also permits the formation of an industrial relations board to be composed equally of employer and employee representatives to handle all labor disputes.

Approval also has been given to an amendment to the code for the refractories industry to reduce by 10 per cent the maximum work week and to proportionately increase minimum wages. This amendment is made in accordance with an agreement made by the industry in response to an appeal of the President at the recent meeting of code authorities to reduce the work week by 10 per cent and at the same time make a like increase in wages. The new work week in the refractories industries now becomes 36 hours, with minimum wage rates for common labor ranging from 27½c. to 44c. per hour.

Wire Reinforcement Hearing

A hearing was held May 1 on the code for the wire reinforcement industry, presented by R. L. Foster, Wickwire-Spencer Steel Co., Buffalo, chairman of the code committee of the Wire Reinforcement Association, who told Deputy Administrator C. L. Hickling and Assistant Deputy Administrator W. L. Schurz that the 12 units in the industry known to the association employ between 900 and 1000 persons. Labor objected to a 40-hour maximum work week, especially when averaged over a six months' period, and to minimum hourly wages, ranging from 25c. to 27c. in certain parts of the South. In fixing minimum hourly wage rates for common labor the country is divided into 21 districts, the rates ranging from 40c. to 25c. Immediately upon approval of the code the association is instructed to call a meeting of the industry at which a code authority of 10 members is to be chosen, exclusive of members without vote to be appointed by the administrator. Published price lists below which products of the industry are not to be sold are required by the code.

Hearings on Codes and Modifications

Public hearing on the proposed code of fair competition for the electroplating and metal polishing and finishing industry, as supplementary to the fabricated metal products manufacturing and metal finishing and metal coating industry, will be held by Deputy Administrator L. S. Horner, on May 18 at the Raleigh Hotel. It is sponsored by the Master Electro Platers Institute of the United States.

Hearing on the proposed code of fair competition for the wiring devices industry as a subdivision of the electrical manufacturing industry will be held on May 14 at the Washington Hotel. The code is sponsored by the National Electrical Manufacturers Association.

The oxy-acetylene industry, through its supervising agency, has submitted an application for the modification of the fair practice provisions contained in the code of fair competition for the trade. A hearing on these modifications will be conducted by Deputy Administrator Joseph F. Battley on May 15. One of the chief proposals asks that the code shall be administered by a supervising agency of 10, chosen by members of the industry.

The code authority for the saw and steel manufacturing industry has submitted a proposed modification in Article VI of the code for the trade, dealing with fair trade practices as applied to prices. Notice has been given that objections to the amendment must be filed with Deputy Administrator Joseph Dilworth, Commerce Building, before May 16.

Code Authorities Named

General Johnson has approved the method of selection and recognized the members of the code authorities for the following industries:

Metal Lath Manufacturing Industry: W. G. Hurlbert, Jr., Bostwick Steel Lath Co., Niles, Ohio; T. H. Herbest, Jr., Consolidated Expanded Metal Companies, Wheeling, W. Va.; W. M. Goldsmith, Goldsmith Metal Lath Co., Cincinnati; L. Kuehn, Milcor Steel Co., Milwaukee; G. A. Sagendorph, Penn Metal Co., Boston; C. H. Scammell, Charles H. Scammell Co., Inc., New York; J. Kahn, Truscon Steel Co., Youngstown; C. F. Henning, United States Gypsum Co., Chicago; J. O. Entrekin, Wheeling Corrugating Co., Wheeling, W. Va., and R. F. Burley, National Gypsum Co., Buffalo.

Printing Equipment Industry and Trade: Arthur Bentley, chairman, Miehle Printing Press & Mfg. Co., Chicago; Thomas R. Jones, American Type Founders Sales Co., Jersey City, N. J.; Joseph T. Mackey, Mergenthaler Linotype Co., Brooklyn; Calvert B. Cottrell, C. B. Cottrell & Sons Co., Westerly, R. I.; James S. Gilbert, Dexter Folder Co., New York, and R. V. Mitchell, Harris Seybold Potter Co., Cleveland.

Die Casting Manufacturing Industry: Members at large, F. P. Assmann, president, Precision Castings Co., Inc., Syracuse, N. Y., and H. H. Doehler, president, Doehler Die-Casting Co., Toledo, Ohio; Eastern region—G. M. Rollason, general manager, Die Casting Division, Aluminum Co. of America, Garwood, N. J.; Central region—H. H. Weiss, president, Superior Die Casting Co., Cleveland; Western region—S. A. Hellings, vice-president and general manager, Stewart Die Casting Corpn., Chicago.

Chilled Car Wheel Manufacturing Industry: E. P. Waud, vice-president, Griffin Wheel Co., Chicago; J. A. Kilpatrick, president, Albany Car Wheel Co., Albany, N. Y.; W. F. Cutler, president, Southern Wheel Co., New York, and D. H. Sherwood, vice-president, Maryland Car Wheel Co., Baltimore.

Paper Making Machine Builders: E. H. Neese, Beloit Iron Works, Beloit, Wis.; C. W. Valentine, Bagley & Sewell Co.,

Watertown, N. Y., and George Sumner Barton, Rice, Barton, Fales, Worcester, Mass.

Objections to the proposed modifications to the textile machinery manufacturing industry's code may be filed in room 4036 of the Commerce Building prior to May 18. The modifications provide for financing the code authority, submitting a budget to the administrator and the collection of assessments.

The code for the can labeling and can casing machinery industry, division of packaging machinery industry and trade, has been approved, effective May 16. Already operating under the wage, hour and labor provisions of a basic code, the industry since signing PRA has increased employment by 48.6 per cent over 1932 figures and payrolls by approximately 42 per cent.

Directorate of Steel Institute Expanded

THE board of directors of the American Iron and Steel Institute will be increased from 30 to 32 members, it was decided at the annual meeting of members of the Institute held at its offices in New York, May 7. The two new directors will be elected later.

The ten directors whose terms expire in 1934 were all reelected for three years. They are E. R. Crawford, president, McKeesport Tin Plate Co.; George G. Crawford, president, Jones & Laughlin Steel Corpn.; H. G. Dalton, chairman, Youngstown Sheet & Tube Co.; W. J. Filbert, vice-chairman, United States Steel Corpn.; L. E. Geohegan, vice-president and general manager, Gulf States Steel Co.; W. W. Holloway, president, Wheeling Steel Corpn.; Frank Purnell, president, Youngstown Sheet & Tube Co.; W. F. Detwiler, vice-president, Allegheny Steel Co.; George M. Verity, chairman, American Rolling Mill Co. and Homer D. Williams, president, Pittsburgh Steel Co.

Exchange Foundry Paper Will Cover Cast Brass

C. M. SAEGER, JR., physicist, United States Bureau of Standards, Washington, and chief of the experimental foundry section of the division of metallurgy of the Bureau, will present the exchange paper of the American Foundrymen's association to the annual meeting of the Institute of British Foundrymen to be held in June. His paper will cover "Studies on Cast Red Brass for the Establishment of a Basic Classification of Nonferrous Ingot Metals for Specification Purposes." It will apply particularly to findings on the 85 per cent copper, 5 per cent tin, 5 per cent zinc and 5 per cent lead alloy.

Protest Exchange Act Strangulation Of Unlisted Companies

WASHINGTON, May 8.—Organized as the National Committee for Modification of Industrial Sections of the Securities Exchange Act, affiliated with the National Association of Manufacturers, 28 prominent industrialists have appealed to chairmen of Congressional committees handling stock market legislation for further liberalization of the Securities Exchange Act. Headed by W. B. Bell, New York, president of the American Cyanamid Co., the committee in a petition addressed to Chairman Fletcher of the Senate Committee on Banking and Currency and Chairman Rayburn of the House Committee on Interstate and Foreign Commerce, says that it has been organized to demand for business the justice which is not now a part of the pending bills. Explaining that "the business corporations of this country are no part of the stock exchanges," the committee states that "It will endeavor to awaken every business man to the fact, apparently little realized, that while ostensibly this legislation is intended only to eliminate recognized speculative abuses from the stock exchanges, actually more than 450,000 firms throughout the land with no Wall Street connection would be brought under the strangling regulation of a Federal bureau.

Among the industrialists on the committee are George M. Laughlin, chairman, Jones & Laughlin Steel Corpn., Pittsburgh; T. M. Girdler, chairman, Republic Steel Corpn., Youngstown; F. A. Merrick, president, Westinghouse Electric & Mfg. Co., New York; George E. Scott, American Steel Foundries, Chicago; W. F. Rockwell, president, The Timken-Detroit Axle Co., Detroit; Rolland J. Hamilton, president, American Radiator Co., New York; W. C. McFarlane, president, Minneapolis Moline Power & Implement Co., Minneapolis; C. A. Liddle, president, Pullman Car & Mfg. Co., Chicago; Charles Bancroft, president, United Shoe Machinery Co., Boston; Charles R. Bottorff, president, Belknap Hardware & Mfg. Co., Louisville, Ky., and Edward Clark, president, Cerro de Pasco Copper Corpn., New York.

The petition points out that Internal Revenue figures show there are about 486,000 corporations doing business in the United States of which only 1365 are listed in the stock exchanges and that there are not more than 3000 listed securities. Some 75 per cent of these corporations, it is stated, do not have an annual income in excess of $25,000 net.

"Yet, this legislation assumes that in order to obtain the purging of the stock markets, with which industry is in sympathy, it is necessary to require numerous reports from all of these thousands of small corporations that have no connection whatsoever with the stock market," the petition says. "The additional bookkeeping and accounting which would be necessary to meet the requirements of Federal regulation would place an unbearable financial burden upon many of the small corporations."

Commerce Statistics for March Reflect Gains

WASHINGTON, May 8.—Production and shipments of commercial steel and malleable castings rose sharply in March, according to reports to the Bureau of the Census, Department of Commerce. Substantial gains were also reported in bookings of fabricated steel plate and in production and shipments of steel barrels.

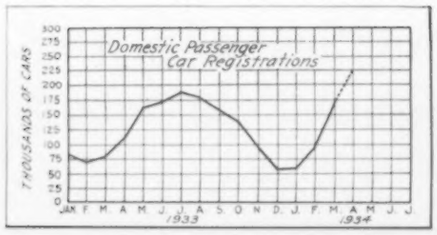
March production of commercial steel castings by 164 identical manufacturers amounted to 39,475 net tons, compared with 28,526 tons in February and with 14,896 tons in March, 1933. New orders, at 60,044 tons, compared with 35,698 tons in the preceding month and with 13,178 tons in March, 1933.

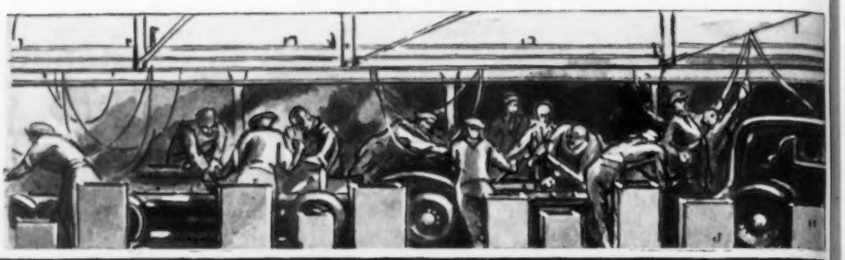
Malleable casting production in March, according to reports by 112 manufacturers, was 43,438 net tons, against 33,939 tons in February and 9959 tons in March of last year. New orders were 42,961 tons in March, 36,594 tons in February and 12,508 tons in March, 1933.

New orders for fabricated steel plate booked during March by 46 manufacturers totaled 38,924 tons, compared with 14,641 tons in February and with 8896 tons in March of last year.

Steel barrel output of 36 firms was 695,681 units in March against 573,391 barrels in the preceding month and 427,562 in the corresponding 1933 period. Shipments rose to 703,101 units from 572,915 in February and 425,682 in March, 1933.

Bids will be opened May 11 by the Bureau of Supplies and Accounts, Navy Department, for 157 tons of sheets for delivery at the Norfolk, Va., navy yard for stock. On May 15 the bureau will open bids for 186 tons of plates for delivery to the Mare Island and Puget Sound yards for stock and for 48 tons of sheets, also for stock.





THIS WEEK ON THE

Production Tapers As Retail Sales Fall Below Expectations

DETROIT, May 8.

THE automobile industry, with the possible exception of the Ford Motor Co., has made up its mind that a summer much leaner in sales and production than it had hoped for is confronting it. Unfavorable factors have appeared one by one until today their cumulative effect is being felt by several manufacturers, notably Hudson, Pontiac and Dodge. It is considered only a matter of time until these influences spread to other companies, bringing about sharp curtailment of output.

To get a clear picture of what is happening today, it is necessary to review the situation in 1933. The production peak of 260,645 units did not occur until June. Then came a fairly steady period—239,628 units in July, 242,566 in August and 201,890 in September. Probably this performance, contrary to usual seasonal trends, can be attributed to the collapse of the banking structure in March and the inevitable recovery in the months following.

Leaders in the automobile industry privately admit that conditions at present are far different from a year ago and, unless unforeseen factors are projected into the situation, the chances of assemblies being sustained at a fairly high level throughout the summer are remote. This represents a radical change in point of view in the last 30 days. It was not uncommon in March and early April for sales executives to talk about the year's total production rising to 3,000,000 to 3,500,000 units. Their story is different today.

Increased Prices Retard Sales

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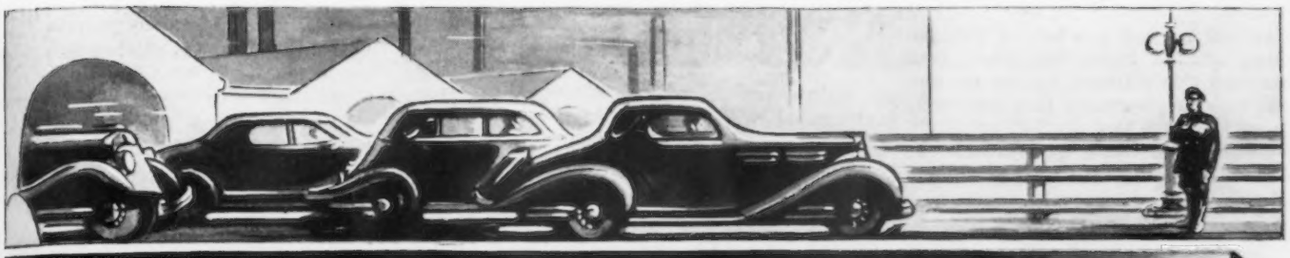

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Detroit Editor, THE IRON AGE

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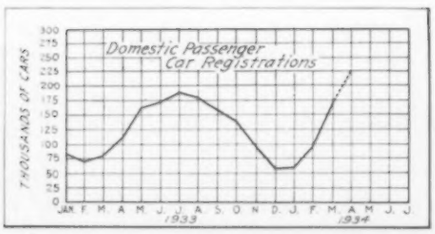

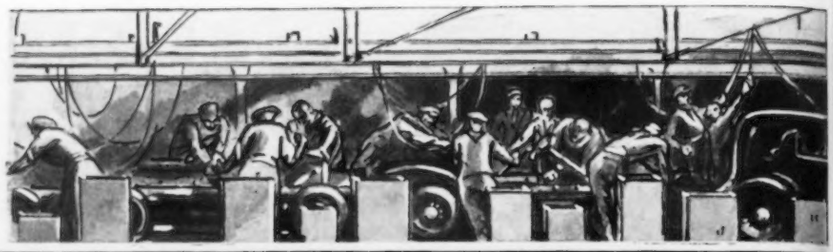

THIS WEEK ON THE

Production Tapers As Retail Sales Fall Below Expectations

DETROIT, May 8.

THE automobile industry, with the possible exception of the Ford Motor Co., has made up its mind that a summer much leaner in sales and production than it had hoped for is confronting it. Unfavorable factors have appeared one by one until today their cumulative effect is being felt by several manufacturers, notably Hudson, Pontiac and Dodge. It is considered only a matter of time until these influences spread to other companies, bringing about sharp curtailment of output.

To get a clear picture of what is happening today, it is necessary to review the situation in 1933. The production peak of 260,645 units did not occur until June. Then came a fairly steady period—239,628 units in July, 242,566 in August and 201,890 in September. Probably this performance, contrary to usual seasonal trends, can be attributed to the collapse of the banking structure in March and the inevitable recovery in the months following.

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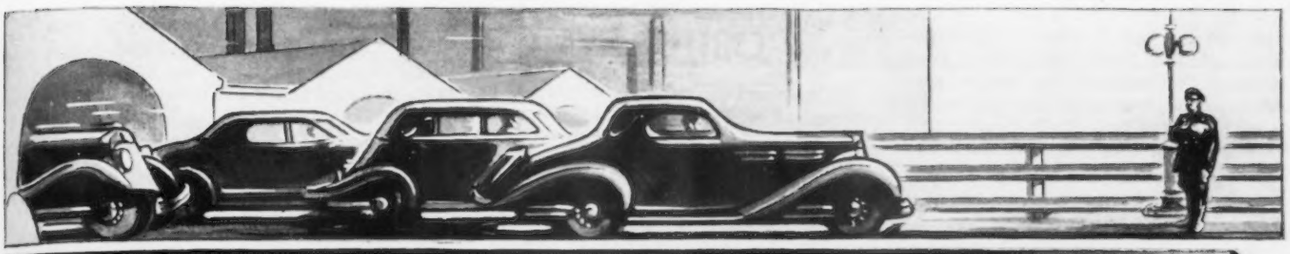

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ment off as just a whim of the moment, at the time that users first assumed this attitude, but as the second quarter progresses they are ready to acknowledge that the tonnage from Detroit is not likely to approach the volume they expected.

Lull in Labor Troubles

At least temporary peace has descended upon the automobile industry. Over the week end Richard Byrd, labor member of the Automobile Labor Board, successfully settled disputes between the management and workers at Chevrolet and Fisher Body plants in Kansas City and St. Louis. Members of Fisher Body plant No. 1 local union at Flint have gone on record against a walkout. The Mechanics Educational Society the past week authorized its members to return to work in plants paying the minimum wage which the society has been advocating. The society also called off all picketing of tool and die shops and returned to members tool boxes which had been locked up at headquarters since the strike was called. This move of the M.E.S. is looked upon as an open acknowledgment of the failure of the strike. The only thing resulting from the strike was the loss of $300,000 worth of business to local shops with consequent loss of work by Detroit tool and die makers.

Detroit Notes

L. P. Fisher is reported to have relinquished the position of president and general manager of the Cadillac Motor Car Co. . . . Murray Corpn. is building 50,000 bodies for Ford V-eights this month, its production running three times as great as in any previous month in the company's history. Murray also is making bodies, chassis or body parts for Hupmobile, Pierce-Arrow, Auburn, Graham and Studebaker. Dietrich, Inc., a Murray subsidiary, is designing and building a number of custom models for Lincoln and Packard. . . . The Chevrolet gray iron foundry at Saginaw, Mich., largest in the United States, recently set an all-time record by pouring in a single day 2152 tons. The daily average melt in April was 1787 tons. The foundry now is working day and night, with two batteries of 12 cupolas in action. . . . The new series 40 Buick will be offered next Saturday in five models. It is powered by a 93-hp. valve-in-head straight-eight engine, with a bore 3 3/32 in. and stroke of 3⅞ in., giving a total displacement of 233 cu. in. Buick claims 15 mi. a gallon for the new car, which resembles the series 50 in appearance and has knee-action wheels.

Net earnings of the Ludlum Steel Co., Watervliet, N. Y., in the first quarter, after deduction of all charges including depreciation and general taxes but not including provision for Federal income tax, amounted to $170,235, as compared with net loss in first quarter of 1933 of $107,756.

▲▲ OBITUARY ▲▲

RICHARD DEWITT PERRY, one of the founders and for 28 years president of the Perry-Fay Co., manufacturer of screw machine products, Elyria, Ohio, died May 6 aged 77 years. He was born in Hartford, Conn., and went to Elyria in 1883 to operate a plant making screw machine products. In 1906 he and W. W. Fay, an associate in the plant, established the Perry-Fay Co.

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C. R. GREGG, member of the firm of Wachs-Gregg & Co., Chicago, machinery dealers, died on April 27. For a number of years previous to the formation of the Wachs-Gregg company he was associated with Joseph T. Ryerson & Son, Inc.

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ROBERT S. GRAHAM, retired structural iron manufacturer, died at his home after an illness of three months on April 23, aged 84 years.

He was born in Dundee, Scotland. His father, Robert Graham, and an uncle Charles Graham founded the structural iron business of Charles Graham & Brothers, of which Mr. Graham became president some years ago. He retired about 5 years ago.

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RICHARD L. CONNER, general manager of the Hoyt Metal Co., St. Louis, when it was taken over by the National Lead Co., died there recently. He was born in England 79 years ago, the son of a member of the British Parliament.

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MAURICE H. STAUFFER, president, Ohio Structural Steel Co., Newton Falls, Ohio, died April 21, aged 51 years. He had been in ill health for some time.

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W. P. MITCHELL, vice-president, Bliss & Laughlin, Inc., Harvey, Ill., was killed April 29 in an automobile accident in New York State, 70 miles out of Buffalo. He had been in the steel industry for the past 32 years, 18 of which were with the Illinois Steel Co. In 1920 he joined the Bliss & Laughlin organization and in March, 1930, he was made vice-president of the company. He was 46 years old.

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GEORGE P. NICHOLS, who from 1894 until his retirement from active business was a partner in the firm of George P. Nichols & Brother, manufacturer of railroad machinery, died recently at a Milwaukee hospital after a long illness. Mr. Nichols was a graduate of the Worcester Polytechnic Institute in 1883. He became connected in 1884 with the Thomson Houston Co., which was merged with the General Electric Co., and which Mr. Nichols served in the capacity of Chicago manager of its motor department.

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ZALMAN G. SIMMONS, chairman of the board, Simmons Co., Kenosha, Wis., manufacturer of steel furniture, died April 26 at Johns Hopkins Hospital, Baltimore, Md., following a major operation. He was born in Kenosha, Nov. 28, 1870, the son of Zalman G. Simmons, Sr., founder of the company, upon whose death in 1910 he became president.

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JONATHAN WARNER, founder and former president of the Trumbull Steel Co., Warren, Ohio, now a part of the Republic Steel Corpn., died at his home in Philadelphia on March 5, aged 69 years. He was born at Mineral Ridge, Ohio, and entered the steel business in 1887, following attendance at Williams College, Williamstown, Mass. He became head of the Struthers Iron Sheet Mills, Struthers, Ohio, in 1895, continuing in that capacity until the formation of the United States Steel Corpn. which absorbed that plant. He then served for a time as president of the Empire Iron & Steel Co., Niles, Ohio. His next connection was with the Trumbull company, from which he resigned in 1925, having since lived in retirement.

Cleveland Labor Situation Better

The labor situation in the Cleveland territory where numerous strikes have been in effect shows some improvement this week. Outstanding in developments was the return to work Monday of the 8500 employees of the Cleveland plant of the Fisher Body Corpn., who had been out a week.

The strike in the 10 rubber mold machine shops in Akron, Ohio, which has been in effect five weeks, ended with a settlement and the resumption of work Monday. The machinists, over 900 in number, failed to win their demands for closed shop. However, the employers agreed to recognize their union to the extent that the union has members in the shop. The men were granted a 4c. per hr. wage increase and elimination of piece work, but failed to secure the minimum wage they demanded.

The strike at the Cleveland plant of the Chase Brass & Copper Co. has collapsed, the employees having returned to work Monday without winning any of their demands.

The 44 tool and die shops in Cleveland are still shut down because of the refusal of the employers to unionize their plants.

Steel Production at Highest Rate Since September, 1930

Negative Factors Are Leveling Off of Automobile Output and Weakness of Scrap Prices—Steel Strike Threat Looms

STEEL production has risen two points to 60 per cent of capacity, the highest rate since September, 1930, but scrap prices continue to recede and automobile production has apparently passed its peak.

Scrap first turned weak some weeks ago when the appearance of open weather resulted in a sudden increase in the available supply. Latterly, however, prices have suffered because of the determination of steel producers to liquidate their scrap inventories by July 1. Reflecting declines at Pittsburgh and Chicago, THE IRON AGE scrap composite has dropped to $11.92 a ton, compared with $12.17 last week and $13 in the second week of March, its peak for this year.

THE changed outlook in the automobile trade is ascribed to a combination of causes, not the least of which is the series of labor disturbances which harassed manufacturers at the height of their sales campaign. Although recent strikes have been settled, there continues to be an uneasy atmosphere in the industry and lost momentum has not been recovered. One automobile maker, now asking for prices on tools and dies, intends to place the orders outside of the Detroit district, being unwilling to take the risk of having the work tied up by strikes.

Other explanations offered for the recession in car sales are the recent increase in retail prices, the suspension of the CWA program and the drought in the Central West, which seriously threatens the purchasing power of a large section of the country.

THE continued rise of steel output in the face of a leveling off of motor car production is accounted for in part by the desire of consumers to take advantage of contracts made prior to recent price advances. However, most of the stocking that has taken place so far has been on the part of the mills. Non-integrated producers have accumulated large supplies of semi-finished steel, and pipe, tube and wire mills have built up stocks in warehouses for shipment next month. In sheets and strip, shipments have been more closely in line with production.

Mills continue to warn customers to enter their specifications early so that delivery can be made before June 30, when all shipments against second quarter contracts must be completed. Producers of certain grades of sheets are already close to the point where they will have to close their books. However, some sheet consumers complain of their inability to anticipate their exact requirements until they have orders for which the sheets are to be used.

IF the response of consumers to mills' pressure for specifications has not been what had been expected, the threat of a steel strike will probably supply the needed impetus. An ultimatum to be presented to steel producers on May 26 by the Amalgamated Association of Iron, Steel and Tin Plate Workers will expire June 20, or shortly before the close of the quarter. While it is not believed likely that a strike to unionize the steel industry could succeed, it is conceded that operations at certain plants might be seriously crippled for a time.

Aside from business done on a quarterly basis, the industry has considerable railroad and structural tonnage which will carry well into July and August. Chicago rail mills are running at 40 per cent of capacity, and Pittsburgh rail production is expected to continue at a steady rate of 20,000 tons a month until September. Output of tin plate, another product not restricted to quarterly contracting periods, has receded to 75 per cent of capacity after holding at 80 per cent for two months. Shipments have failed to come up to expectations, with the result the producers' warehouses are heavily stocked.

THE announcement of General Johnson that the steel code would be extended with "slight" amendments beyond its present expiration date of May 31 conforms with opinion in the iron and steel industry. Modifications now under consideration include the creation of additional basing points, recognition of water rates in arriving at delivered prices on finished steel and the establishment of quantity discounts on purchases of large tonnages.

Stainless steel strip (18 and 8) has been advanced 3c. a lb., but the recent $3 a ton increase on sheet steel piling has been withdrawn. THE IRON AGE composite prices on finished steel and pig iron are unchanged at 2.222c. a lb. and $17.90 a ton.

Steel output during the week increased two points to 49 per cent at Pittsburgh, three points to 64 per cent at Chicago, three points to 46 per cent in the Philadelphia district, one point to 63 per cent in the Valleys, and seven points to 65 per cent in the South. Operations dropped two points to 65 per cent at Cleveland and two points to 68 per cent at Buffalo. Detroit output is still at 100 per cent of capacity.

▲▲▲ A Comparison of Prices ▲▲▲

Market Prices at Date, and One Week, One Month, and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron

	May 8, 1934	May 1, 1934	Apr. 10, 1934	May 9, 1933
Per Gross Ton:				
No. 2 fdy., Philadelphia	$20.26	$20.26	$19.26	$15.34
No. 2, Valley furnace	18.50	18.50	17.50	14.50
No. 2 Southern, Cin'ti	19.13	19.13	18.13	15.82
No. 2, Birmingham†	**14.50**	13.50	13.50	12.00
No. 2 foundry, Chicago*	18.50	18.50	17.50	15.50
Basic, del'd eastern Pa.	19.76	19.76	18.76	15.09
Basic, Valley furnace	18.00	18.00	17.00	14.00
Valley Bessemer, del'd P'gh.	20.76	20.76	19.76	16.89
Malleable, Chicago*	18.50	18.50	17.50	15.50
Malleable, Valley	18.50	18.50	17.50	14.50
L. S. charcoal, Chicago	24.04	24.04	23.54	23.17
Ferromanganese, seab'd carlots	85.00	85.00	85.00	68.00

†This quotation is for delivery in South; in the North prices are 38c. a ton under delivered quotations from nearest Northern furnace.
*The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Rails, Billets, etc.

Per Gross Ton:				
Rails, heavy, at mill	$36.37½	$36.37½	$36.37½	$40.00
Light rails, Pittsburgh	35.00	35.00	32.00	30.00
Rerolling billets, Pittsburgh	29.00	29.00	26.00	26.00
Sheet bars, Pittsburgh	30.00	30.00	26.00	26.00
Slabs, Pittsburgh	29.00	29.00	26.00	26.00
Forging billets, Pittsburgh	34.00	34.00	31.00	31.00
Wire rods, Pittsburgh	38.00	38.00	36.00	35.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.70	1.70	1.60	1.60

Finished Steel

Per Lb.:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.90	1.90	1.75	1.60
Bars, Chicago	1.95	1.95	1.80	1.70
Bars, Cleveland	1.95	1.95	1.80	1.65
Bars, New York	2.23	2.23	2.08	1.95
Plates, Pittsburgh	1.85	1.85	1.70	1.50
Plates, Chicago	1.90	1.90	1.75	1.70
Plates, New York	2.13	2.13	1.98	1.598
Structural shapes, Pittsburgh	1.85	1.85	1.70	1.60
Structural shapes, Chicago	1.90	1.90	1.75	1.70
Structural shapes, New York	2.10¼	2.10¼	1.95¼	1.86775
Cold-finished bars, Pittsburgh	2.10	2.10	2.10	1.70
Hot-rolled strips, Pittsburgh	2.00	2.00	1.75	1.45
Cold-rolled strips, Pittsburgh	2.80	2.80	2.40	1.80

Finished Steel

	May 8, 1934	May 1, 1934	Apr. 10, 1934	May 9, 1933
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Hot-rolled annealed sheets, No. 24, Pittsburgh	2.65	2.65	2.25	2.00
Hot-rolled annealed sheets, No. 24, Gary	2.75	2.75	2.35	2.10
Sheets, galv., No. 24, P'gh	3.25	3.25	2.85	2.70
Sheets, galv., No. 24, Gary	3.35	3.35	2.95	2.80
Hot-rolled sheets, No. 10, P'gh	2.00	2.00	1.75	1.40
Hot-rolled sheets, No. 10, Gary	2.10	2.10	1.85	1.50
Wire nails, Pittsburgh	2.60	2.60	2.35	1.85
Wire nails, Chicago dist. mill	2.65	2.65	2.40	1.90
Plain wire, Pittsburgh	2.30	2.30	2.20	2.10
Plain wire, Chicago dist. mill	2.35	2.35	2.25	2.15
Barbed wire, galv., Pittsburgh	3.00	3.00	2.85	2.35
Barbed wire, galv., Chicago dist. mill	3.05	3.05	2.90	2.40
Tin plate, 100 lb. box, P'gh	$5.25	$5.25	$5.25	$4.25

Scrap

Per Gross Ton:				
Heavy melting steel, P'gh	*$13.25*	$13.75	$14.25	$12.25
Heavy melting steel, Phila	11.25	11.25	11.75	8.75
Heavy melting steel, Ch'go	*11.25*	11.50	11.75	8.50
Carwheels, Chicago	11.50	11.50	11.75	8.50
Carwheels, Philadelphia	12.75	12.75	13.00	9.75
No. 1 cast, Pittsburgh	*13.25*	13.75	13.75	10.50
No. 1 cast, Philadelphia	*12.50*	13.00	13.25	10.25
No. 1 cast, Ch'go (net ton)	9.25	9.25	9.50	8.00
No. 1 RR. wrot., Phila	12.50	12.50	11.00	10.75
No. 1 RR. wrot., Ch'go (net)	*9.00*	9.25	9.50	6.00

Coke, Connellsville

Per Net Ton at Oven:				
Furnace coke, prompt	$3.85	$3.85	$3.85	$1.75
Foundry coke, prompt	4.60	4.60	4.60	2.50

Metals

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Electrolytic copper, refinery‡	8.25	8.25	8.25	6.50
Lake copper, New York‡	8.62½	8.62½	8.50	6.75
Tin (Straits), New York	*54.05*	54.65	55.80	36.00
Zinc, East St. Louis	*4.35*	4.40	4.40	3.75
Zinc, New York	*4.70*	4.75	4.75	4.12
Lead, St. Louis	4.10	4.10	4.15	3.52½
Lead, New York	4.25	4.25	4.25	3.65
Antimony (Asiatic), N. Y.	**8.60**	7.95	7.95	6.25

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables. ‡Blue Eagle copper.

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▲▲▲ The Iron Age Composite Prices ▲▲▲

	Finished Steel	Pig Iron	Steel Scrap
May 8, 1934	2.222c. a Lb.	$17.90 a Gross Ton	$11.92 a Gross Ton
One week ago	2.222c.	17.90	12.17
One month ago	2.028c.	16.90	12.58
One year ago	1.867c.	14.33	9.83
	Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strips. These products make 85 per cent of the United States output.	Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.	Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	Finished Steel		Pig Iron		Steel Scrap	
	High	Low	High	Low	High	Low
1934	2.222c., April 24	2.028c., Jan. 2	$17.90, May 1	$16.90, Jan. 27	$13.00, Mar. 13	$11.33, Jan. 2
1933	2.036c., Oct. 3	1.867c., April 18	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.977c., Oct. 4	1.926c., Feb. 2	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.42, July 5
1931	2.037c., Jan. 13	1.945c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.273c., Jan. 7	2.018c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.317c., April 2	2.273c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3
1928	2.286c., Dec. 11	2.217c., July 17	18.59, Nov. 27	17.04, July 24	16.50, Dec. 31	13.08, July 2
1927	2.402c., Jan. 4	2.212c., Nov. 1	19.71, Jan. 4	17.54, Nov. 1	15.25, Jan. 11	13.08, Nov. 22

Production in Further Gain at Pittsburgh

Local Rate Up to 49 Per Cent, While Valley Average Reaches 63 Per Cent—Pipe, Wire, Strip and Sheet Mills Speed Up

PITTSBURGH, May 8.—Total consumption of steel appears to have undergone a slight increase, with a small decrease in the automobile industry and offsetting increases in a few of the relatively minor lines. Much stocking of steel is expected to take advantage of contracts made prior to the recent price advances, shipments on which must be completed by June 30. Thus far, however, there has been little stocking except in semi-finished steel. The policy of mills is to step up production promptly so as to have as uniform an operation as possible in the remainder of the quarter in the interest of low cost.

Production of steel ingots in the Pittsburgh district this week will average 49 per cent of capacity against 47 per cent last week and 37 per cent four weeks ago. Increases have been widespread, the most notable instance being resumption of the Bessemer department at the McKeesport pipe mill. The Wheeling district remains at 79 per cent, while the Valleys and nearby Northern points are up one point to an average of 63 per cent.

Pipe, tube and wire mills have stepped up operations sharply in the last fortnight, partly by increasing steel production and partly by using stocks of steel, some of the product being held in warehouse for shipment next month. In strips and sheets there is heavier production with correspondingly heavier shipments. As plates and shapes cannot be stocked and consumption is virtually unchanged, there is no noticeable increase in production. Rail production is expected to be fairly steady at fully 20,000 tons a month into August.

In the tin plate industry as a whole operations are at about 75 per cent after two months at approximately 80 per cent. The heavy operation earlier in the year was due partly to provision against possible labor trouble, while this menace is now regarded as slight.

The scrap market has had a sharp decline with sales of heavy melting steel to mills at $13.50 and down to $13. The recession is ascribed to much scrap coming out since the winter broke, while mills have been light buyers with a policy of liquidating inventories thoroughly by July 1.

Pig Iron

Shipments of pig iron are lighter following a slight spurt at the time prices advanced. Consumers are covered by contracts through the quarter and are expected to take deliveries more freely next month. Instances of new buying, at the advanced prices now ruling, are rare. It is reported that iron foundries are less active than 60 days ago.

Semi-Finished Steel

The detached finishing mills have already begun to stock up heavily on contracts made at the old prices, and expect to reach June 30 with stocks equal to two or three months of consumption, at the reduced rate expected to prevail after next month. Current consumption is heavy meanwhile.

Rails and Track Accessories

The local mill is rolling some rails every week on releases received from time to time, and expects to produce not less than 20,000 tons a month through July if not through August. Movement of track materials is fairly heavy.

Bars

Specifications on contracts for soft steel bars are being receved at a fair rate, but mills still fear there will be a rush in June, taxing their facilities, and are urging customers to specify freely on this month's quotas. Shipments to the automobile industry are at a high rate, and the industry is expected to have quite a stock by June 30.

Movement of concrete reinforcing bars has increased but is still far from heavy.

Cold-Finished Steel Bars

Demand for cold-finished steel bars is heavy from the automobile industry and miscellaneous consumers, giving the mills an operation of about 60 per cent. So far there is no evidence of stocking, although it has been known for some time that the price would be advanced for third quarter. The advance will probably be announced within two or three weeks and will be not less than $4 a ton.

Plates and Shapes

Movement of plates for freight car building and repairs is heavier, while there is very little other business and no barge business at all.

Structural shapes are moving to fabricators at about the same rate as for a long time past. The American Bridge Co. has booked a 4000-ton job, the Hillside Housing Group in the Bronx, New York.

Wire Products

Wire mills are operating at high rates, in some cases at close to capacity, partly for the current needs of jobbers but partly in connection with jobbers stocking up against contracts at the recently expired prices. Mills wanted specifications early and are willing to carry much of the material in warehouse, to ship next month. Jobbers will accumulate much larger stocks than they did last December, as they are stocking against a different season of year. Movement of manufacturing wire is fairly heavy.

Tubular Goods

Pipe and tube mills have been stepping up production sharply in anticipation of heavy shipping orders to take advantage of old contracts. Actual consumptive demand has increased quite noticeably, following several months in which increases were perceptible only by close comparisons. Oil country goods have shown a greater increase than standard pipe. There is no demand for line pipe and no prospects are really visible.

Tin Plate

After running for nine weeks at a rate of about 80 per cent, the tin plate industry is down to an average of about 75 per cent this week. Mills that have reduced operations did so with the idea of spreading the work and perhaps of returning to the old rate. Producers are surprised by the volume of demand, considering how much stocking of tin plate and cans there was late in the old year. Consumption of general line cans is fairly heavy, milk is doing very well and pack of fruits and vegetables is expected to run somewhat above last year, while a large increase is predicted in tomatoes.

Sheets

Shipping orders have been very heavy, with some producers the heaviest since 1930. Consuming requirements have increased in the electrical and farm implement industries, while the automobile industry is doing as well as 30 days ago and better than last week, as some labor troubles have been ended. The sheet industry is up

to an operation around 60 per cent. It is manifest that consumers desire to accumulate good-sized stocks by June 30 and mills fear a jam in the case of the special finishes. Accordingly they are urging customers to specify early, as capacity in the special finishes is limited. Within a fortnight or so they will probably establish dead lines, beyond which they will not be able to accept shipping orders and guarantee delivery by June 30, the last day on which shipments can be made at old prices. There has been some heavy buying of galvanized sheets for car roofs, this being business which does not come under the date limitation as protections can be given on railroad work.

Strip Steel

Strip mills are operating at as high rates as is feasible without incurring much extra expense, averaging about 75 per cent of full capacity. While shipping orders have been heavy, producers fear their consumers will want heavier deliveries in June than can be made and are continually urging customers to specify early or run the risk of cancellation. Demand comes from a wide variety of sources. Some of the orders received are dated for later shipment, but the automobile industry is calling for deliveries as early as they can be made. It is expected to accumulate stocks later in the quarter as its consumptive requirements decrease.

Coal and Coke

Mines in the Pittsburgh coal district are nearly all running at capacity, measured by 35 hr. a week against 40 hr. before the new wage scale went into effect April 1. Operations have increased sharply in the last three weeks, owing chiefly to opening of shipments in the Lake trade, now at a fairly heavy rate. Demand in the line trade is increased somewhat, due to reduction of stocks laid in during March rather than to increase in consumption.

April was a light month in shipments of foundry coke, and May has not started out any better. Foundries had laid in some stocks, while it is doubted whether they are running as well as in March.

Scrap

A small independent mill has purchased moderate quantities of No. 1 heavy melting steel during the past seven-day period at $13.50, $13.25 and $13. The largest tonnage was placed at $13.50, while the small order, on which hydraulic bundled sheets may be shipped, was booked at $13. Based on these purchases and the willingness on the part of most brokers to sell at $13.50 or possibly lower, No. 1 heavy melting steel this week is off 50c. a ton at $13 to $13.50. Practically all other grades are equivalently lower. Machine shop turnings and short shoveling steel turnings are particularly soft at 75c. below last week's prices. Short mixed borings and turnings and cast iron borings have resisted the general trend and are unchanged. Scrap on the recent Pennsylvania Railroad list was disposed of at prices reported to have been far below those realized on the list for the preceding month, when No. 1 steel was sold at as high as $15.25, delivered. On the last list that grade is reported to have been sold at $13.25, delivered.

New England Trade Slackens

BOSTON, May 8.—Current pig iron buying is largely confined to scattered carlots. Aggregate sales prior to the last price advance, while fairly substantial, were under those of a year ago because this year furnaces could not sell beyond July 1, whereas last year they sold for deliveries up to Oct. 1. A considerable portion of the iron sold this year for second quarter delivery unquestionably will be for third quarter consumption. Antagonism to the New Deal is increasing and there has been some slackening in New England trade, including the foundry business.

Although not enough business has been transacted in the grades of scrap to really establish a market, prices for No. 1 and No. 2 steel, T-rails and breakable cast are about 25c. a ton lower in sympathy with the weakness at Pittsburgh. A little shafting is moving at $11.25 a ton on cars shipping point, and sales of steel turnings at $3.25 a ton are reported. Some brokers cannot pay more than $3 for turnings, but are securing no tonnages at that figure.

Since the recent advance in foundry coke prices, specifications against contracts have leveled off.

Strikes Fail to Check Output in South

BIRMINGHAM, May 8.—New pig iron tonnage is small, because of the heavy buying just prior to the advance from $13.50 to $14.50. Not much new business is looked for this month. May shipments are expected to show a marked improvement over April.

Furnace operations are unchanged, with 10 stacks active.

Cast iron pipe business continues spotty. Miami, Fla., has awarded approximately 7900 tons to United States Pipe & Foundry Co., but as this is a PWA project, with considerable routine still ahead, it will probably be three or four months before the tonnage is released. Universal Pipe Co. was low on about 600 tons at San Francisco last week. This week Ordway, Colo., will open bids on 600 tons and Mare Island, Cal., on about 250 tons.

All iron mines in the district are closed, as a result of a strike on May 4. All of the furnace companies have sufficient stocks on hand to run them for a month or more without further production.

The strike at the furnace plant of Republic Steel Corpn. continues, but operations are practically normal, it is stated.

Steel

Steel operations have been at a steady and higher rate for some weeks. Second quarter contracts, at the old prices, provided for distribution of tonnage through the quarter and these specifications have been coming in at a good rate. There has also been more new tonnage than was expected at this time. Wire products and sheets are holding their improvement.

Last week, active open-hearth furnaces numbered from 14 to 15 of the 24 in the district, as compared with 14 the preceding week. During the present week the schedule will likely be 15 and 16.

Pig Iron Melt Up at St. Louis

ST. LOUIS, May 8.—While the pig iron market is quiet, as far as buying is concerned, the melt is being increased, this being especially true in the jobbing and specialty foundries, which have been speeding up production in anticipation of a wage advance of 10 per cent, which becomes effective June 18. The stove plants are said to be making up many units for stock. Washing machine and other home appliance makers in the district are said to be busier than they have been in many years.

An award of 110 tons of plates and fittings for suction and discharge pipe for the United States Engineer's Office at Memphis has been made to Ellicott Machine Co., Baltimore, Md. Bids will be opened today for a highway bridge in Okfuskee County, Okla., requiring 275 tons of structurals. H. B. Deal & Co., Inc., St. Louis, has been awarded the general contract for an addition to a city hospital here, requiring 450 tons of reinforcing bars.

The Edwardsville plant of the United States Radiator Corpn., which has been operating a little better than two days a week during the last six months, began operations yesterday on a 4½-day basis.

Some grades of scrap are from 25c. to 50c. a ton lower in price than in the preceding week. Stocks of mills are reported to be fairly ample, and buyers have assumed a waiting attitude. On top of this, offers from the country are larger, and dealers' current orders are pretty well covered.

Drought Threatens Farm Areas Tributary to Chicago

But Ingot Rate Rises Three Points to 64 Per Cent—Scrap Again Declines—Warehouse Prices Are Advanced

CHICAGO, May 8.—Ingot output continues to push upward, the gain in the past seven days having been three points to 64 per cent of capacity. Rail mill operations still hold at 40 per cent of capacity, and pressure for sheet bars and other semi-finished materials is insistent. Car builders' shops and railroad shops are taking more car materials, and there are consistent gains in releases of reinforcing bars and structural materials.

Of paramount importance in the Middle West is the continued drought, which has already seriously threatened the purchasing power of large areas, not alone in so far as grain crops are concerned but also as to pasturage and the income derived from dairy herds.

The lighter steel products, as represented by wire and wire products, are in greater demand, but the gain is in manufacturers' lines, whereas country consumption has fallen rather sharply. Warehouses report the same trend, use in the country having dropped away in the last few weeks. Farm implement manufacturers, though holding for the present to production schedules, as previously planned, are keeping a sharp eye on the drought situation, which they feel has already retarded their normal expectations by at least a month.

The scrap market is listless and cannot at this time be used as an indicator of trends. Mills are in general holding out against offers of brokers and, in the presence of a liberal flow of material, are drawing specifications so tight that automobile heavy melting steel frequently does not get past mill gates.

Pig Iron

The purchasing end of this market is quiet but specifications are gaining slowly and May promises to be the best month of the year. Although it is not at all assured that prices will again advance in the near future, nevertheless producers are closely studying costs which so far have outstripped advances in selling prices.

Coke

Prices are firm and May shipments are moving at a rate that is approximately 10 per cent higher than that of April. Foundry schedules are generally higher, with the exception of automobile parts makers, who give indication of traveling on a dead level.

Cast Iron Pipe

Producers, viewing added labor costs and higher prices for pig iron and other materials, are giving closer attention to cast iron pipe prices, which so far remain unchanged at $44 to $45 a ton, delivered Chicago, for the 6-in. and larger sizes. Releases on the newer PWA projects are still slow and few jobs are reaching the contracting stage. The United States Pipe & Foundry Co. is low bidder on 483 tons of 24-in. pipe for Chicago.

Reinforcing Bars

The market is quiet, offering little encouragement beyond the fact that architects are more active and will use some small tonnages for remodeling work. New public work is dwindling rapidly, though some large tonnages are overhanging the market. S. A. Healy will soon place about 1300 tons for Sanitary District work at Chicago. The Fort Peck, Mont., project, requiring 3800 tons, is reported awarded, but contracts were not placed with Chicago bar fabricators. New prices, $3 a ton above old levels, are in full effect.

Rails and Track Supplies

Operations are holding at the 40 per cent rate reached a week ago and specifications are in such volume that this rate can be continued. New buying of standard-section rails is lacking, but mills are holding open for this month the prices that were to have expired April 15. Demand for light rails is somewhat improved. Track accessory departments are being speeded up to meet current demand, which is in proportion to rail shipments. New purchases are light. Mill books are open for new accessory business at current prices, which are effective only for the month of May.

Structural Material

From the mill viewpoint this market is more active, releases having been climbing upward for the past two weeks. However, lists of awards and inquiries are decidedly smaller than in either of the last two weeks. There is a notable falling off of inquiries for highway bridge work, and private business is small. Some fabricators report that estimating departments are almost without work of either the large or very small individual tonnage types. Illinois will open bids May 22 on 600 tons for bridges and on the same date Indiana will receive tenders for a like tonnage.

Plates

This market continues to drag, though there is some improvement in specifications from car building shops and railroads that are carrying on larger car repair programs. It is probable that the Chicago Great Western cars will be ordered this week. Line pipe work is lacking and oil storage tank orders are few and far between. Probably the heaviest movement at this time is in plates needed for current structural building and bridge work.

Wire Products

Output has advanced five points to 65 per cent of capacity and new specifications are in sufficient volume to assure retention of this rate. Here and there rush orders are making their appearance, indicating that material is actually going into consumption. Another interesting development is the cancellation of about 25 per cent of the tonnage booked before recent advances in prices, thereby clearing books of much speculative tonnage.

Bars

Tonnages being taken by automobile builders is steady but the character of releases indicates to sellers that automobile production either already has passed its peak or is about to taper off. It is thought by some that labor difficulties have more to do with this situation than has demand from the public. Farm implement manufacturers are deeply concerned because of the drought in the Central West, though production schedules have not yet been reduced. Tooling activity for 1935 automobiles is actively under way.

Warehouse Business

Orders remain at a substantial level, the average so far in May being almost on a par with the first week in April, the third week of which month was the best for any week since 1929. Orders from the country are slower whereas city business is creeping upward. Warehouses are mailing out new price lists.

Scrap

Prices continue to ease, with most grades now quotable at 25c. a ton below levels of a week ago. One mill has taken a fair tonnage of heavy melting steel, but otherwise there is a disposition on the part of large buyers to resist offers. The Chicago & North Western has sold heavy melting steel at $11.53 a gross ton, delivered, which is a new low price accepted by a railroad.

Strike Threat Looms as Market Factor at New York

But Tin Plate Releases Still Lag—Quantity Discounts, Water Deliveries and New Basing Points Now Under Consideration

NEW YORK, May 8.—Steel specifications from buyers in this district are finally commencing to show some response to the pressure of mills for releases. One producer has notified customers that its books on sheets will be closed on May 15. Shipments of tin plate, contracts for which are not limited to a single calendar quarter, remain in disappointing volume and producers have so much material stocked in their warehouses that an early reduction in output seems unavoidable. Whether specifications for tin plate, as well as other steel products, will be stimulated by the threat of a steel strike is still uncertain, although highly probable. While it is unlikely that the Amalgamated association can achieve its objectives, it is conceded that it may succeed in crippling mill operations for a time.

The recent advance of $3 a ton on sheet steel piling to 2.15c. a lb., Pittsburgh, has been withdrawn and the former price of 2c. has been reestablished. One reason for the withdrawal was that announcement of the advance resulted in the covering of all pending and prospective piling jobs at the old price. Another factor may have been the appearance of foreign competition on the Atlantic seaboard. The Socony Vacuum Co. recently awarded 2000 tons of piling for a Staten Island dock and bulkhead to a German maker.

Stainless steel (18 and 8) hot-rolled and cold-rolled strip have been advanced 3c. a lb. to 23c. and 30c., Pittsburgh, respectively.

Code Changes

The commercial committee of the American Iron and Steel Institute was in session last week and early this week studying various suggested changes in code practices. Among them is the proposed abolition of lump sum quantity extras on bars and the imposition of per pound extras not only on bars but also on plates and shapes which have heretofore carried no quantity extras. This proposal is favored by steel warehouses, but is opposed by State highway commissions as well as by small fabricators, who contend that they will be placed at a disadvantage with jobbers who sometimes take small fabricating contracts.

Another subject which has been engaging the attention of the commercial committee is the advisability of setting up quantity mill discounts on finished steel products as a concession to the pressure from larger buyers. Under the code as it is now operating a single price prevails for both large and small purchasers. Quantity discounts would recognize the economies inherent in large orders, but they would be open and standard, thereby preventing a restoration of the competitive abuses which grew out of secret concessions.

The commercial committee is also considering recognition of water rates in arriving at delivered prices on finished steel. Since there are no tariffs covering water rates and they vary considerably, it is possible that arbitraries may be set up, similar to those employed to cover switching rates. New basing points are among the other proposals the committee is weighing. Suggested new bases include Duluth on bars and billets, St. Louis on shapes and plates, Detroit on bars, strip and sheets and Youngstown on sheets.

Steel selling offices complain because of the failure of the code authority to adopt and enforce standard contract forms. Various forms of contracts were recommended by the commercial committee to the board of directors some months ago, but they were never officially approved by that body. As a consequence there has been a reappearance of the old form of option contract under which the mill agrees to ship up to a maximum tonnage but the buyer assumes no obligation to take any steel if he does not choose to do so. Even the requirement contract — one of those recommended to the directors—is not much better. While it binds the buyer to give a mill a stated percentage of its requirements, it does not force him to take a definite minimum tonnage.

Pig Iron

Sales of specialty and foundry irons aggregated 425 tons during the past seven-day period, against 1700 tons last week, and 3700 tons booked two weeks ago. Sellers report moderately satisfactory specifications against the heavy contracts recently made, although it is expected that a large proportion of contract shipments will be delayed until June. As most melters are considered overbought, the third quarter stock carryover will probably be of sufficient magnitude to prolong the current inactivity in buying through July. The banked Swede furnace at Swedeland, Pa., resumed production May 1, the Troy stack was blown in last Friday, and the Republic furnaces at Birmingham are again in blast following temporary banking because of labor difficulties.

Reinforcing Steel

Most of the requirements for large projects were covered last week before the $3 a ton advance became effective, but there is still a fair amount of miscellaneous tonnage being placed each day. Billet and rail steel bars are now respectively 2.05c. and 1.90c. a lb., Pittsburgh, and a $1 a ton trucking charge is still in effect for deliveries in the Metropolitan area. A post office in Holyoke, Mass., and a bridge at Greenwich, Conn., accounted for 100 tons each last week, and pending jobs include a total of over 1000 tons for a Queens, N. Y., grade separation, a foundation wall on Ellis Island, N. Y., and the third section of the Philadelphia-Camden bridge improvement.

Scrap

Practically all domestic mills have stocked second quarter scrap requirements and are refusing to consider new business in view of the general expectation of much lower operating rates after June 30. The cessation of demand in outside selling markets is reflected in a soft undertone here, but prices on steels remain unchanged on the strength of purchases for foreign melters. Almost all domestic contracts for heavy melting steels have been completed, and shipments of cast grades to Phillipsburg, N. J., are being held up. Heavy melting steels are now each established at one price of $9 and $7.50 for No. 1 and No. 2 respectively. Unprepared yard iron and steel is 50c. lower at $4.50 to $5 a ton, although $5.75 is being paid in several directions for very desirable lots. The remainder of the list is inactive and quotably nominal. Local brokers have export backlogs averaging about one month, and fresh business is again in moderate volume despite the discouraging influence of price softness.

The Ford Motor Co. has placed order with Allis-Chalmers Mfg. Co., Milwaukee, for an electric drive costing $160,000 for its new roughing mill. The equipment includes three 3000-hp. motors and a number of auxiliary motors.

Ingot Output Again Declines at Cleveland

Rate Off Two Points to 65 Per Cent—Mills Press for Specifications—Season's Ore Price Not Yet Established

CLEVELAND, May 8.—Consumers continue to order steel freely against finished steel contracts. Some of the orders specify as early deliveries as possible and others shipment at convenience of the mills. Demand from the automotive industry has not regained the volume it attained before shipments were checked by recent labor troubles and it is believed that the tonnage from this source has passed its season's peak.

Ingot output in the Cleveland-Lorain territory declined two points this week to 65 per cent of capacity, one local open-hearth furnace being taken off. A third blast furnace has started up in Lorain.

Releases of sheets now are mostly for June shipment and one producer announces that it already has all the tonnage of some full finished grades that it will be able to ship before June 30, when all shipments against old contracts have been completed. Producers of bars, plates and shapes do not expect to have trouble in getting out before the end of June all the tonnage that will be ordered against outstanding contracts, provided buyers show reasonable promptness in sending in their releases. However, consumers of alloy steel bars are being warned to get their June specifications in promptly because of the time required in processing.

Some sheet consumers are complaining that they cannot order steel several weeks in advance in anticipation of future requirements because, owing to the character of their business, they cannot prepare specifications until they have orders for which the sheets are to be used.

Some sheet business in small lots has been placed at the new prices and in other cases consumers have allowed part of their April tonnage to lapse. Virtually no business in other products has been taken at the higher prices.

New construction projects include a Government breakwater at Fairport requiring 1000 tons of sheet steel piling.

Pig Iron

Heavy shipping orders against contracts are coming out. A leading producer reports that shipments so far this month are 60 per cent greater than in the corresponding period of April although it is not expected that this increase will be maintained through the month. Some consumers are evidently building up stocks. There is no slackening in the demand from the automotive industry. No sales are being made at the new prices.

Sheets

Demand from the automotive industry continues good, although specifications are not quite so heavy as before the recent temporary check in automobile production caused by labor troubles. Instead of an expected slowing up of the refrigerator industry, some refrigerator manufacturers have increased their production schedules and steel releases. Stove and washing machine manufacturers continue to take good tonnages. Steel barrel production has declined. While some consumers allowed April tonnage to lapse, others were not fully covered at the old prices and a few small orders have been placed at the higher prices.

Strip Steel

Specifications continue fairly heavy, although shipments are now being held up by some of the automobile parts manufacturers who did not scale down their schedules two weeks ago when motor car production was curtailed by labor troubles. These plants evidently have produced an excess supply of parts, and are waiting for the automobile companies to catch up.

Iron Ore

No commitments that would definitely establish prices for the season have as yet been made. Consumers generally have good stocks and show a disposition to reduce inventories, and the only immediate demand is from a limited number of buyers who are short of certain grades. A few small-lot open market inquiries are pending. In view of the increased cost of operating Lake boats there is some possibility of a higher vessel carrying charge for ore and this would be absorbed by the mining companies should last season's ore prices be reestablished, as is expected. The Ford Motor Co., which recently bought 50,000 tons in a deal which was not a determining factor in this season's prices, is expected to be in the market shortly for a much larger tonnage. Dock shipments during April were 416,225 tons, as compared with 104,395 tons during April last year. The dock balance at Lake Erie ports May 1 was 4,570,626 tons, as compared with 4,969,363 tons on the same date a year ago. The ore shipping season has opened with the dispatch of several cargoes from upper Lake ports.

Bolts, Nuts and Rivets

Some bolt and nut shipments were held up by automobile manufacturers during their recent labor troubles but these are now being released. The volume of business is practically the same as last month. Rivets have become somewhat more active, as orders are starting to come from car builders for use in the recently placed freight cars. Some small-lot sales are being made at the advanced prices.

Bars, Plates and Shapes

Bar releases continue heavy. Mills are getting well filled with specifications of alloy bars for the remainder of the quarter. Plates are moving fairly well in small lots. Structural awards include two jobs requiring 550 tons. New inquiry is light. Bids will be taken shortly for a Y. M. C. A. building in Toledo requiring 700 tons. A new announcement of an advance on rail steel reinforcing bars in cut lengths to 1.95c., Cleveland, Youngstown and Buffalo, effective May 15, evidently brings all makers in line with the $3 a ton advance.

Warehouse Business

Local warehouses have adopted a new price set-up for cold-rolled strip, which they are now quoting at 3.20c. base for local and 3.10c. for out-of-town delivery, to which quantity and other extras are added. Under the new schedule there is a slight reduction and prices more closely conform with mill prices in lots up to 1000 lb.

Scrap

The market is inactive and prices show a weakening tendency. Considerable blast furnace scrap is coming by water to Cleveland from Detroit and a cargo of steel-making scrap from Canada was delivered to a Cleveland consumer late in the week. Youngstown district mills are restricting shipments.

A survey of lead production throughout the world was the subject of a paper presented by J. R. Finlay, chairman, sub-committee on lead, to the Mining and Metallurgical Society of America. A pamphlet copy of the paper has been published at the office of the secretary of the society, Col. Percy E. Barbour, 76 Beaver Street, New York.

Steel Production Higher In Philadelphia District

Releases Against Contracts Well Sustained With New Business Lacking—Warehouse Prices Advanced $5 a Ton

PHILADELPHIA, May 8.—Continued releases against second quarter contracts have again forced mills in this district to advance steel ingot output which is estimated this week at 46 per cent of capacity. The rate last week was only 43 per cent. A steelworks blast furnace has resumed production and two or three open-hearth plants are engaged at better than 50 per cent. Finishing mill schedules are still somewhat irregular. Shape capacity is engaged at a very low rate, but plate mills are running at about 50 per cent. Sheet mill schedules are close to capacity on some finishes and producers are taking business only for June delivery. Tin plate operations have continued high, but shipments have not kept pace with production and sizable stocks have been accumulated.

Releases from the railroads are still the mainstay of eastern Pennsylvania mills. No new business is being booked, but orders already placed will serve as a backlog through August at least. The strike in the Camden, N. J., plant of the New York Shipbuilding Co. is in its seventh week with settlement still deferred. This seriously hampers the aggregate requirements of the shipbuilding industry in the district.

The new prices on finished steel products have received no test. The $3 a ton advance on sheet steel piling has been withdrawn as practically all prospective tonnage had been covered at the old level. The advance in the jobbers' resale price on pipe to conform with recent mill increases has been postponed until July 1. Warehouse prices on all the commoner products except sheets have been advanced $5 a ton. Black and galvanized sheets had been marked up previously.

Pig Iron

Shipments against contracts continue at a fair rate. Steel foundries are rather busy, largely because of railroad orders. Soil pipe producers are doing very little and some of them were sufficiently well stocked with iron to obviate the necessity of their buying additional material for the current quarter. Stove foundries are engaged at a better rate, but average foundry operations in the district as a whole do not average higher than 35 per cent.

Bars, Plates and Shapes

Structural steel and reinforcing bars continue quiet so far as new business is concerned. PWA work is not heavy in this district and has been confined to a few outstanding jobs. Private work of sizable proportions is exceptional. New bids were taken today on the Middletown, Pa., flying field, requiring 3000 tons of shapes. The last section of the high speed approach to the Philadelphia-Camden bridge will come out this week. It will require approximately 1700 tons of shapes, 700 tons of bars and 1000 tons of sheet steel piling. Plate releases from the railroads and car builders are satisfactory, but demand from other sources is disappointing. The requirements of the shipbuilding industry are seriously curtailed by labor troubles.

Sheets

Specifications for sheet steel have been sufficiently heavy to engage part of the district's facilities at capacity. June schedules are already being arranged and some producers are already booked up for that period. However, the large automobile body builders in the territory have curtailed their releases and new business from other sources is hardly sufficient to offset that loss. Radio makers are fairly busy and stove manufacturers are taking more material. A growing tonnage is originating from makers of cooling and ventilating equipment.

Warehouse Business

Warehouses here have advanced bars, plates, shapes, floor plates, hoops, bands and No. 10 gage hot-rolled annealed sheets $5 a ton. Reinforcing bars have been marked up $3 a ton and are now quoted at 2.955c., delivered, for lots of less than 2000 lb. Black and galvanized sheets were marked up three weeks ago. Warehouse demand is slightly heavier.

Imports

The following iron and steel imports were received here last week: 70 tons of steel rounds and 3 tons of steel bands from France, 33 tons of steel flats from Germany, and 23 tons of steel bands and 14 tons of structural shapes from Belgium.

Scrap

The scrap market is quiet and continues weak. Since purchases of No. 1 heavy melting steel by two consumers at $11.50 and by another at $11, no new buying has been reported. A sale of heavy breakable cast at $11.50 has established that grade at a lower level. Specialties and No. 1 cast are weaker and heavy steel axle turnings have been marked down in sympathy with steel. Export demand continues and is largely responsible for the support of No. 1 and No. 2 steel at current levels.

Shipments at Good Rate At Cincinnati

CINCINNATI, May 8.—The district pig iron market is listless. Current business, not exceeding 300 tons, is from miscellaneous sources and covers only urgent requirements. Inquiry is nil. Shipments against contract, however, are at a good rate and indicate a desire of consumers to take material ordered even though in some instances it is being stacked. Foundries catering to stove and automotive demand report a fairly good melt, but jobbing and machine tool foundries reflect the general lack of demand in other fields.

Warehouse Business

Steel jobbers are receiving a steady demand from industrial sources which is comparable to April business. Except for a 400-ton bar order for sewer construction in Cincinnati, the construction demand is without interest. Prices on galvanized and hot-rolled annealed sheets advanced on Monday.

Finished Steel

General sheet steel demand is holding to a level equal to about 65 per cent of mill capacity. While automotive demand has leveled off, business from miscellaneous users has increased. Specifications against contract are lagging somewhat and mills are urging earlier releases.

Coke

Shipments of by-product foundry coke are slightly better, but new business is light. Birmingham ovens are still out of the market, following recent code authority orders increasing labor costs.

Scrap

With mills well committed on raw materials, and third quarter prospects uncertain, new business is almost negligible. Shipments retain stability,

although limited to the mills' ability to handle them. Dealers' bids are tending lower, with the market undertone softer.

Coast Mill Output Still Rising

SAN FRANCISCO, May 7.—General improvement in business is reflected in a stepping up of production. Ingots poured have sharply increased in the last 30 days and pig iron has shown better than seasonal gains. Tin mills are reported to be operating at capacity. Sheets and wire products are active. Reinforcing, structural steel and plates are moving in greater volume. Cast iron pipe business has shown improvement.

Virginia Bridge & Iron Co. took the heaviest tonnage of the week when it was awarded one unit of the Coos Bay bridge in Oregon which calls for 3622 tons of structural steel and 199 tons of reinforcing bars. It is reported that the Gastineau Channel bridge near Juneau, Alaska, requiring 1200 tons of structural steel, was booked by Pacific Car & Foundry Co. Commercial Shearing & Stamping Co. and McClintic-Marshall Corpn. took approximately 3100 tons of plates and shapes for tunnels for the Metropolitan Water District at Los Angeles. Awards are expected shortly for 933 tons and 765 tons of cast iron pipe at Oakland and San Francisco respectively.

Among the few new inquiries was one of 2000 tons of structural steel for tunnel ribs for the Metropolitan Water District at Los Angeles. New business aggregated 2503 tons of shapes, 618 tons of bars and 500 tons of plates, while bookings totaled 5371 tons of shapes and 781 tons of bars.

Buffalo District Melters Covered Till July

BUFFALO, May 8.—It is estimated that about 90 per cent of the foundries have covered for their pig iron requirements until the first part of July. Foundry operations are spotty with those making machinery and automotive parts on good production schedules, but the radiation industry and foundries manufacturing soil pipe and material for the building industry are not very active. Sales of pig iron have been in small lots the last week, with no sizable inquiries out.

Bethlehem's Lackawanna plant is now operating 16 open-hearths, one less than last week; Republic Steel Corpn. continues with six and Wickwire-Spencer Corpn. with two. The Seneca sheet division of Bethlehem continues at 90 per cent. A Buffalo concern will fabricate 240 tons of structural steel for a new school, and an increase is noted in small lettings of structural steel.

Two sales of scrap were the only outstanding transactions during the past week. One thousand tons of No. 1 and No. 2 heavy melting steel was sold at $11.50 and $10 respectively and another lot of 1000 tons was sold to another mill at $12 and $10.50 for No. 1 and No. 2 respectively. The principal buyer is out of the market for some time, it is stated, with 60,000 tons on yard and approximately 7000 tons additional expected this week by barge and boat. A barge tie-up due to a canal breakdown at Amsterdam, N. Y., may disturb this program. The market is sloppy and all grades are weaker. All mills are restricting shipments.

Detroit Scrap Market Still Falling

DETROIT, May 8.—The scrap market is sagging perceptibly, with prices on all but a few items down 25c. to 50c. a ton. For the first time in the history of the local trade steel mills are asking for hold-ups of boat shipments of scrap as well as of rail deliveries. Dealers have few orders on hand and confess that they are at a loss to know what to bid on pending lists. Their experience recently has been to bid low in the expectation of passing by the tonnage only to find the scrap awarded to them.

Your cost records and sales records will prove
THOMASTRIP
STRIP COLD ROLLED STEEL
PRECOATED WITH ZINC OR COPPER
A BETTER MATERIAL FOR YOUR PRODUCT
Send for test Samples. Specify width, gauge, temper and coat desired.
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WARREN, OHIO
SPECIALIZED PRODUCERS OF COLD ROLLED STRIP STEEL

Prices of Finished and Semi-Finished Steel, Coke, Coal, Cast Iron Pipe

BARS, PLATES, SHAPES

Iron and Steel Bars

	Soft Steel Base per Lb.
F.o.b. Pittsburgh	1.90c.
F.o.b. Chicago or Gary	1.95c.
Del'd Philadelphia	2.19c.
Del'd New York	2.23c.
F.o.b. Cleveland	1.95c.
Del'd Detroit	2.05c.
F.o.b. Buffalo	2.00c.
F.o.b. Birmingham	2.05c.
F.o.b. cars dock Pacific ports	2.45c.
F.o.b. cars dock Gulf ports	2.30c.

Rail Steel
(For merchant trade)

F.o.b. Cleveland	1.85c.
F.o.b. Chicago	1.85c.
F.o.b. Gary	1.85c.
F.o.b. Pittsburgh	1.80c.
F.o.b. Buffalo	1.90c.
F.o.b. Birmingham	1.95c.
F.o.b. cars dock Gulf ports	2.20c.
F.o.b. cars dock Pacific ports	2.35c.

Billet Steel Reinforcing
(Cut lengths as quoted by distributers)

F.o.b. Pittsburgh	2.05c.
F.o.b. Chicago	2.10c.
F.o.b. Birmingham	2.10c.
F.o.b. Buffalo	2.10c.
F.o.b. Cleveland	2.10c.
Del'd Detroit	2.20c.
F.o.b. Youngstown	2.10c.
F.o.b. cars dock Pacific ports	2.60c.
F.o.b. cars dock Gulf ports	2.45c.

Rail Steel Reinforcing
(Cut lengths as quoted by distributers)

F.o.b. Pittsburgh	1.90c.
F.o.b. Cleveland	1.95c.
F.o.b. Gary	1.95c.
F.o.b. Chicago	1.95c.
F.o.b. Buffalo	1.95c.
F.o.b. Birmingham	1.95c.

Iron

Common iron, f.o.b. Terre Haute, Ind.	1.75c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Phila.	1.89c. to 1.99c.
Common iron del'd N. Y.	1.93c. to 2.03c.

Steel Car Axles

F.o.b. Pittsburgh	2.65c.
F.o.b. Chicago	2.65c.
F.o.b. Birmingham	2.65c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh	1.85c.
F.o.b. Chicago	1.90c.
F.o.b. Gary	1.90c.
F.o.b. Birmingham	2.00c.
Del'd Cleveland	2.035c.
Del'd Philadelphia	2.035c.
F.o.b. Coatesville	1.95c.
F.o.b. Sparrows Point	1.95c.
Del'd New York	2.13c.
F.o.b. dock cars Pacific ports	2.40c.
F.o.b. cars dock, Gulf ports	2.25c.
Wrought iron plates, f.o.b. P'gh	3.00c.

Floor Plates

F.o.b. Pittsburgh	3.35c.
F.o.b. Chicago	3.40c.
F.o.b. Coatesville	3.45c.
F.o.b. cars dock Gulf ports	3.75c.
F.o.b. cars dock Pacific ports	3.90c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh	1.85c.
F.o.b. Chicago	1.90c.
F.o.b. Birmingham	2.00c.
F.o.b. Buffalo	1.95c.
F.o.b. Bethlehem	1.95c.
Del'd Cleveland	2.035c.
Del'd Philadelphia	2.055c.
Del'd New York	2.1025c.
F.o.b. cars dock, Gulf ports	2.25c.
F.o.b. dock cars Pacific ports (standard)	2.40c.

Steel Sheet Piling

	Base per Lb.
F.o.b. Pittsburgh	2.15c.
F.o.b. Chicago	2.25c.
F.o.b. Buffalo	2.25c.
F.o.b. cars dock Gulf ports	2.60c.
F.o.b. cars dock Pacific ports	2.60c.

Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.
Open-hearth grade, base 2.55c. a lb.
Delivered price at Detroit is 2.70c.

S.A.E. Series Numbers	Alloy Differential per 100 lb.
2000 (1/2% Nickel)	$0.25
2100 (2 1/2% Nickel)	0.55
2300 (3 1/2% Nickel)	1.50
2500 (5% Nickel)	2.25
3100 Nickel Chromium	0.55
3200 Nickel Chromium	1.35
3300 Nickel Chromium	3.80
3400 Nickel Chromium	3.20
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum) (1.50 to 2.00 Nickel)	1.05
5100 Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100 Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100 Chromium Spring Steel	base
6100 Chromium Vanadium Bar	1.20
4100 Chromium Vanadium Spring Steel	0.95
Chromium Nickel Vanadium	1.50
Carbon Vanadium	0.95

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. The differential for cold-drawn bars is 1/2c. per lb. higher with separate extras. Blooms, billets and slabs under 4x4 in. or equivalent are sold on the bar base. Slabs with a section area of 16 in. and 2 1/2 in. thick or over take the billet base. Sections 4x4 in. to 10x10 in. or equivalent carry a gross ton price, which is the net price for bars for the same analysis. Larger sizes carry extras.

Cold Finished Bars and Shafting*

	Base per Lb.
Pittsburgh	2.10c.
Chicago	2.15c.
Cleveland	2.15c.
Buffalo	2.20c.
Detroit	2.30c.
Eastern Michigan	2.35c.

* In quantities of 10,000 to 19,000 lb.

SHEETS, STRIP, TIN PLATE TERNE PLATE

Sheets

Hot Rolled

	Base per Lb.
No. 10, f.o.b. Pittsburgh	2.00c.
No. 10, f.o.b. Gary	2.10c.
No. 10, del'd Detroit	2.20c.
No. 10, del'd Phila.	2.29c.
No. 10, f.o.b. Birmingham	2.15c.
No. 10, f.o.b. dock cars Pacific ports	2.55c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh	2.65c.
No. 24, f.o.b. Gary	2.75c.
No. 24, del'd Detroit	2.85c.
No. 24, del'd Phila.	2.94c.
No. 24, f.o.b. Birmingham	2.80c.
No. 24, f.o.b. dock cars Pacific ports	3.25c.
No. 24, wrought iron, Pittsburgh	4.30c.

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh	2.55c.
No. 10 gage, f.o.b. Gary	2.65c.
No. 10 gage, del'd Detroit	2.75c.
No. 10 gage, del'd Phila.	2.84c.
No. 10 gage, f.o.b. dock cars Pacific ports	3.25c.

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh	3.15c.
No. 20 gage, f.o.b. Gary	3.25c.
No. 20 gage, del'd Detroit	3.35c.
No. 20 gage, del'd Phila.	3.44c.
No. 20 gage, f.o.b. dock cars Pacific ports	3.70c.

Galvanized Sheets

No. 24, f.o.b. Pittsburgh	3.25c.
No. 24, f.o.b. Gary	3.35c.
No. 24, del'd Phila.	3.54c.
No. 24, f.o.b. Birmingham	3.40c.
No. 24, f.o.b. dock cars Pacific ports	3.85c.
No. 24, wrought iron, Pittsburgh	4.95c.

Long Ternes

No. 24, unassorted 8-lb. coating f.o.b. Pittsburgh	3.65c

Vitreous Enameling Stock

No. 20, f.o.b. Pittsburgh	3.20c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.85c.
No. 28, Gary	2.95c.

Tin Plate

	Base per Box
Standard cokes, f.o.b. P'gh district mill	$5.25
Standard cokes, f.o.b. Gary	5.35
Standard cokes, f.o.b. cars dock Pacific ports	5.90

Terne Plate

(f.o.b. Pittsburgh)
(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$10.00
15-lb. coating I.C.	12.00
20-lb. coating I.C.	13.00
25-lb. coating I.C.	14.00
30-lb. coating I.C.	15.25
40-lb. coating I.C.	17.50

Hot-Rolled Hoops, Bands, Strips and Flats under 1/4 In.

	Base per Lb.
All widths up to 24 in., P'gh	2.00c.
All widths up to 24 in., Chicago	2.10c.
All widths up to 24 in., del'd Detroit	2.20c.
Cooperage stock, Pittsburgh	2.10c.
Cooperage stock, Chicago	2.20c.

Cold-Rolled Strips

F.o.b. Pittsburgh	2.80c.
F.o.b. Cleveland	2.80c.
Del'd Chicago	3.08c.
F.o.b. Worcester	3.00c.

Fender Stock

No. 16 and heavier, Pittsburgh or Cleveland	3.20c.
F.o.b. Worcester	3.60c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland.)

	To Manufacturing Trade Per Lb.
Bright wire	2.30c.
Spring wire	3.20c.

To Jobbing Trade

Extras of 10c. a 100 lb. on joint carloads and 30c. on pooled cars and less-than-carload lots are applied on all merchant wire products. An allowance of $2 a ton is made to jobbers on straight, mixed or joint carloads; $3 a ton is allowed on less-than-carload shipments.

	Base per Keg
Standard wire nails	$2.60
Smooth coated nails	2.60
Galvanized nails:	
15 gage and coarser	4.60
16 gage and finer	5.10
	Base per 100 Lb.
Smooth annealed wire	$2.45
Smooth galvanized wire	2.80
Polished staples	3.30
Galvanized staples	3.55
Barbed wire, galvanized	3.00
Woven wire fence, base column	63.00

Chicago and Anderson, Ind., mill prices are $1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is $2 above Pittsburgh); Duluth, Minn., and Worcester, Mass., mill prices are $2 a ton over Pittsburgh (except for woven wire fence at Duluth which is $3 over Pittsburgh), and Birmingham mill prices are $3 a ton over Pittsburgh.

STEEL AND WROUGHT PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Steel Black	Steel Galv.	Wrought Iron Inches	Wrought Iron Black	Wrought Iron Galv.
1/8	51 1/2	29 1/2	1/8	+9	1 1/2 +138
1/4 to 3/4	53 1/2	35	1/4 & 3/8	+1 1/2	+21 1/2
1/2	58 1/2	47	1/2	+3	1 1/2 15
3/4	62	52	3/4	+3	6 1/2 20 1/2
1 to 3	64	55	1 & 1 1/4	3	9 1/2 25 1/2
			1 1/2	+4	3 1/2 28
			2	+4	1 1/2 26

Lap Weld

2	60	51	2	37	22 1/2
2 1/2 to 3	63	54	2 1/2 to 3 1/2	38	25
3 1/2 to 6	65	56	4 to 8	40	28 1/2
7 and 8	64	54	9 to 12	38	24 1/2
9 and 10	63 1/2	53 1/2			
11 and 12	62 1/2	52 1/2			

Butt Weld, extra strong, plain ends

1/8	48 1/2	33 1/2	1/8	+13	+45 1/2
1/4 to 3/8	51	38	1/4 & 3/8	+2 1/2	+34 1/2
1/2	56 1/2	47 1/2	1/2	+3	2 1/2 17 1/2
3/4	61	52	3/4	+3	7 1/2 22 1/2
1 to 3	63	55	1 to 2	43 1/2	29

Lap Weld, extra strong, plain ends

2	58	50	2	40	26
2 1/2 to 3	62	54	2 1/2 to 4	45 1/2	33
3 1/2 to 6	65 1/2	57 1/2	4 1/2 to 6	45	32 1/2
7 and 8	64 1/2	54 1/2	7 & 8	46	33
9 and 10	63 1/2	53 1/2	9 to 12	41 1/2	30
11 and 12	62 1/2	52 1/2			

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2 1/2 points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		Charcoal Iron	
2 in. and 2 1/4 in.	33	1 1/2 in.—1 3/4 in.	44
2 1/2 in.—2 3/4 in.	40	2 in.—2 1/4 in.	13
3 in.	44	2 1/2 in.—2 3/4 in.	16
3 1/4 in.—3 1/2 in.	47	3 in.	17
4 in.	49	3 1/4 in. to 3 1/2 in.	18
4 1/2 in. to 6 in.	42	4 in.	20
		4 1/2 in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts.

Lap welded steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload 4 points under base and two fives. Charcoal iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five. Exception: On 1 1/2 to 1 3/4-in. charcoal iron tubes no supplementary discounts are granted, and the discount for 10,000 lb. to a carload is 4 points under base and for less than 10,000 lb. 8 points under base.

Standard Commercial Seamless Boiler Tubes

Cold-Drawn

1 in.	68	3 in.	38
1 1/4 to 1 1/2 in.	68	3 1/4 to 3 1/2 in.	41
1 3/4 in.	68	4 in.	43
2 to 2 1/4 in.	27	4 1/2, 5 and 6 in.	36
2 1/2 to 2 3/4 in.	34		

Hot-Rolled

2 and 2 1/4 in.	33	3 1/4 to 3 1/2 in.	47
2 1/2 and 2 3/4 in.	40	4 in.	49
3 in.	44	4 1/2, 5 and 6 in.	42

In the case of all sizes except 1-in. to 1 3/4-in. cold-drawn boiler tubes supplementary discounts of two 5 per cents are allowed on carload lots. On quantities up to 10,000 lb. the base discount is reduced 10 points and a supplementary discount of 5 per cent only is allowed. On quantities 10,000 lb. to 24,999 lb. the base discount is reduced 6 points and a supplementary discount of 5 per cent only is allowed. On 25,000 lb. to a carload the base discount is reduced 2 points and supplementary discounts of two 5 per cents are allowed.

On 1 to 1 3/4-in. cold-drawn boiler tubes, there are no supplementary discounts. On quantities up to 10,000 lb. the base discount is reduced 12 points; on 10,000 lb. to 24,999 lb., it is reduced 8 points; on 25,000 lb. to a carload it is reduced 4 points.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30% base (carloads)	55
Carbon, 3.30% to 40% base	50

Plus differential for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

RAILS AND TRACK SUPPLIES

F.o.b. Mill

Standard rails, 60-lb. and heavier, per gross ton	$36.37 1/2
Angle bars, per 100 lb.	2.55

F.o.b. Code Basing Points

Light rails (from billets) per gross ton	$35.00
Light rails (from rail steel) per gross ton	34.00

	Base per 100 Lb.
Spikes, 9/16 in. and larger	$2.40
Spikes, 1/2 in. and smaller	2.40
Spikes, boat and barge	2.40
Tie plates, steel	1.90
Track bolts, to steam railroads	3.55
Track bolts, to jobbers, all sizes (per 100 count)	.70 per cent off list

BOLTS, NUTS, RIVETS AND SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
Machine bolts	70
Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages, P'gh, 70, 25 and 10	
Stove bolts in packages, Ch'go. 70, 25 and 10	
Stove bolts in packages, Cleveland, 70, 25 and 10	
Stove bolts in bulk, P'gh	85
Stove bolts in bulk, Chicago	85
Stove bolts in bulk, Cleveland	85
Tire bolts	60

Large Rivets
(1/2-in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$3.00
F.o.b. Chicago	3.10
F.o.b. Birmingham	3.15

Small Rivets
(7/16-in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 5
F.o.b. Cleveland	70 and 5
F.o.b. Chicago and Birm'g'm	70 and 5

Cap and Set Screws

(Freight allowed up to but not exceeding 65c. per 180 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws, 1 in. dia. and smaller	75, 10 and 10
Milled standard set screws, case hardened, 1 in. dia. and smaller	75 and 10
Milled headless set screws, cut thread 3/8 in. and smaller	75
Upset hex. head cap screw, U.S.S.S. or S.A.E. thread, 1 in. dia. and smaller	85
Upset set screws cut and oval point	75 and 10
Milled studs	65 and 5

STAINLESS STEEL

(18% Cr. 8% Ni. 0.08 to 0.12% C)
(Base Prices, f.o.b. Pittsburgh)

	Per Lb.
Bars	23c.
Plates	26c.
Sheets	33c.
Hot-rolled strip	20c.
Cold-rolled strip	27c.

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

F.o.b. Pittsburgh, Youngstown, Chicago, Gary, Buffalo, Cleveland, Birmingham.

	Per Gross Ton
Rerolling	$29.00
Forging quality	34.00
Delivered Detroit	
Rerolling	$32.00
Forging quality	37.00

Sheet Bars

F.o.b. Pittsburgh, Youngstown, Cleveland, Chicago, Buffalo, Canton, Sparrows Point.

	Per Gross Ton
Open-hearth or Bessemer	$30.00

Skelp

F.o.b. Pittsburgh, Youngstown, Chicago, Buffalo, Coatesville, Pa., or Sparrows Point, Md.

	Per Lb.
Grooved	1.70c.
Universal	1.70c.
Sheared	1.70c.

Pig Iron, Ores, Ferroalloys

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	$38.00
Cleveland	38.00
Chicago	39.00
Birmingham	41.00
Youngstown (del'd)	39.00

ALLOY STEEL BLOOMS, BILLETS AND SLABS

F.o.b. Pittsburgh, Chicago, Buffalo, Massillon, Canton or Bethlehem. Base price, $51 a gross ton. Price del'd Detroit is $54.

CARBON STEEL FORGING INGOTS

F.o.b. Pittsburgh, Youngstown, Cleveland, Gary, Chicago or Birmingham. Uncropped, $31 per gross ton.

COKE, COAL AND FUEL OIL

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville Prompt	$3.85
Furnace, f.o.b. Connellsville Prompt	$4.60 to 5.60
Foundry, by-product, Chicago ovens, for delivery outside switching district	8.50
Foundry, by-product, delivered in Chicago switching district	9.25
Foundry, by-product, New England, delivered	11.00
Foundry, by-product, Newark or Jersey City, del'd	8.20 to 8.81
Foundry, by-product, Phila.	9.00
Foundry, by-product, Cleveland, delivered	9.25
Foundry, Birmingham	4.75
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry, by-product, del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.80 to $2.05
Mine run coking coal f.o.b. W. Pa.	2.05 to 2.25
Gas coal, ¾-in. f.o.b. Pa. mines	2.25 to 2.55
Mine run gas coal, f.o.b. Pa. mines	2.05 to 2.45
Steam slack, f.o.b. W. Pa. mines	1.55 to 1.65
Gas slack, f.o.b. W. Pa. mines	1.90 to 2.10

Fuel Oil

Per Gal. f.o.b. Bayonne, N. J.

No. 3 distillate	4.00c.
No. 4 industrial	3.50c.

Per Gal. f.o.b. Baltimore

No. 3 distillate	4.00c.
No. 4 industrial	3.50c.

Per Gal. del'd Chicago

No. 3 industrial fuel oil	3.73c.
No. 5 industrial fuel oil	3.00c.

Per Gal. f.o.b. Cleveland

No. 3 distillate	5.75c.
No. 4 industrial	5.50c.
No. 5 industrial	4.75c.

REFRACTORIES

Fire Clay Brick

	Per 1000 f.o.b. Works High-heat Duty Brick	Intermediate Duty Brick
Pennsylvania	$45.00	$40.00
Maryland	45.00	40.00
New Jersey	55.00	43.00
Ohio	45.00	40.00
Kentucky	45.00	40.00
Missouri	45.00	40.00
Illinois	45.00	40.00
Ground fire clay, per ton	7.00	

Chrome Brick

	Per Net Ton
Standard size	$45.00

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$45.00
Chicago	54.00
Birmingham	55.00
Silica clay, per ton	8.00

Magnesite Brick

	Per Net Ton
Standard sizes, burned, f.o.b. Baltimore and Chester, Pa.	$65.00
Unburned, f.o.b. Baltimore	55.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Domestic, f.o.b. Chewelah, Wash.	22.00

CAST IRON PIPE

	Per Net Ton
6-in. and larger, del'd Chicago	$44.00 to $45.00
4-in., del'd Chicago	47.00 to 48.00
6-in. and larger, del'd New York	43.00
4-in. del'd New York	46.00
6-in., and larger, Birmingham,	36.00 to 37.00
4-in. Birmingham	39.00 to 40.00

Class "A" and gas pipe, $3 extra

PIG IRON

PRICES PER GROSS TON AT BASING POINTS

Basing Points	No. 2 Fdry.	Malleable	Basic	Bessemer
Everett, Mass.	$19.50	$20.00	$19.00	$20.50
Bethlehem, Pa.	19.50	20.00	19.00	20.50
Birdsboro, Pa.	19.50	20.00	19.00	20.50
Swedeland, Pa.	19.50	20.00	19.00	20.50
Sparrows Point, Md.	19.50	....	19.00	....
Neville Island, Pa.	18.50	18.50	18.00	19.00
Sharpsville, Pa.	18.50	18.50	18.00	19.00
Youngstown	18.50	18.50	18.00	19.00
Buffalo	18.50	19.00	17.50	19.50
Erie, Pa.	18.50	19.00	18.00	19.50
Cleveland	18.50	18.50	18.00	19.00
Toledo, Ohio	18.50	18.50	18.00	19.00
Jackson, Ohio	20.25	20.25	19.75	....
Detroit	18.50	18.50	18.00	19.00
Hamilton, Ohio	18.50	18.50	18.00	19.00
Chicago	18.50	18.50	18.00	19.00
Granite City, Ill.	18.50	18.50	18.00	....
Duluth, Minn.	19.00	19.00	....	19.50
Birmingham	14.50	14.50	13.50	19.00
Provo, Utah	17.50	....	17.00	....

DELIVERED PRICES PER GROSS TON AT CONSUMING CENTERS

	No. 2 Fdry.	Malleable	Basic	Bessemer
Boston Switching District From Everett, Mass.	$20.00	$20.50	$19.50	$21.00
Brooklyn From East Pa. or Buffalo	21.77	22.27	21.27	22.77
Newark or Jersey City, N. J. From East. Pa. or Buffalo	20.89	21.39	20.39	21.89
Philadelphia From Eastern Pa.	20.26	20.76	19.76	21.26
Cincinnati From Hamilton, Ohio	19.51	19.51	19.01	20.01
Canton, Ohio From Cleveland and Youngstown	19.76	19.76	19.26	20.26
Columbus, Ohio From Hamilton, Ohio	20.50	20.50	....	....
Mansfield, Ohio From Cleveland and Toledo	20.26	20.26	....	....
Indianapolis From Hamilton, Ohio	20.77	20.77	....	....
South Bend, Ind. From Chicago	20.55	20.55	....	....
Milwaukee From Chicago	19.50	19.50	....	....
St. Paul From Duluth	20.44	....	....	....
Davenport, Iowa From Chicago	20.26	20.26	....	....
Kansas City From Granite City	21.04	21.04	....	....

Delivered prices on Southern iron for shipment to Northern points are 38c. a gross ton below delivered prices from the nearest Northern basing points.

LOW PHOSPHORUS PIG IRON

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y. $23.50
Johnson City, Tenn. 19.50
Del'd Chicago 25.15

GRAY FORGE PIG IRON

Valley furnace $17.50

CHARCOAL PIG IRON

Lake Superior furnace $21.00
Delivered Chicago 24.04
Delivered Buffalo 24.28

CANADA

Pig Iron

Per gross ton:

Delivered Toronto

No. 1 fdy., sil. 2.25 to 2.75	$21.00
No. 2 fdy., sil. 1.75 to 2.75	20.50
Malleable	21.00

Delivered Montreal

No. 1 fdy., sil. 2.25 to 2.75	$22.50
No. 2 fdy., sil. 1.75 to 2.25	22.00
Malleable	22.50
Basic	22.00

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard, (carload)	$85.00
Domestic, 80%, seaboard, (ton lots)	92.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$26.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50% (carloads)	$77.50
50% (ton lots)	85.00
75% (carloads)	126.00
75% (ton lots)	136.00
14% to 16% (f.o.b.) Welland, Ont. (in carloads) (duty paid)	31.00
14% to 16% (less carloads)	38.50

Silvery Iron

F.o.b. Jackson, Ohio, Furnace

Per Gross Ton		Per Gross Ton	
6%	$22.25	12%	$29.25
7%	23.25	13%	30.75
8%	24.25	14%	32.75
9%	25.25	15%	33.75
10%	26.25	16%	35.25
11%	27.75	17%	36.75

Bessemer Ferrosilicon

F.o.b. Jackson, Ohio, Furnace

Per Gross Ton		Per Gross Ton	
10%	$27.25	14%	$33.25
11%	28.75	15%	34.75
12%	30.25	16%	36.25
13%	31.75	17%	37.75

Manganese 1½ to 3%, $1 a ton additional. For each unit of manganese over 3%, $1 a ton additional. Phosphorus 0.75% or over, $1 ton additional.

Other Ferroalloys

Ferrotungsten, per lb. contained W. del., carloads	$1.35 to $1.45
Ferrotungsten, less carloads	1.40 to 1.50
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr. per lb. contained Cr. delivered, in carloads	10.00c.
Ferrochromium, 2% carbon	16.50c. to 17.00c.
Ferrochromium, 1% carbon	17.50c. to 18.00c.
Ferrochromium, 0.10% carbon	19.50c. to 20.00c.
Ferrochromium, 0.06% carbon	20.00c. to 20.50c.
Ferrovanadium, del., per lb. contained V	$2.70 to $2.90
Ferrocarbontitanium, 15 to 18% Ti, 6 to 8% C, f.o.b. furnace carload and contract per net ton	$137.50
Ferrophosphorus, electric, or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton with $2 unitage	50.00
Ferrophosphorus, electric, 24% f.o.b. Anniston, Ala., per gross ton with $2.75 unitage	65.00
Ferromolybdenum, per lb. Mo., del.	95c.
Calcium molybdate, per lb. Mo., del.	80c.
Silico spiegel, per ton, f.o.b. furnace, car lots	$38.00
Ton lots or less, per ton	45.50
Silico-manganese, gross ton, delivered:	
2.50% carbon grade	90.00
2% carbon grade	95.00
1% carbon grade	105.00
Spot prices	$5 a ton higher

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range, Bessemer, 51.5% iron	$4.80
Old range, non-Bessemer, 51.50% iron	4.65
Mesabi, Bessemer, 51.50% iron	4.65
Mesabi, non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron, low phos., copper free, 55 to 58% iron, dry Spanish or Algerian	9.50c.
Iron, low phos., Swedish, average 68½% iron	9.50c.
Iron, basic or foundry, Swedish, average, 65% iron	9c.
Iron, basic or foundry, Russian, aver. 65% iron	9c.
Manganese, Caucasian, washed 52%	24c.
Manganese, African, Indian, 44-48%	21c.
Manganese, African, Indian, 49-51%	24c.
Manganese, Brazilian, 46 to 48½	20c.

	Per Net Ton Unit
Tungsten, Chinese, wolframite, duty paid, delivered*	$17.00
Tungsten, domestic scheelite, delivered	$14.50 to 15.00

	Per Gross Ton
Chrome, 45%, Cr_2O_3, crude, c.i.f. Atlantic Seaboard	$17.00
Chrome, 48% Cr_2O_3, c.i.f. Atlantic Seaboard	20.00

*Quotations nominal in absence of sales.

Fluorspar

	Per Net Ton
Domestic, washed gravel, 85-5 f.o.b. Kentucky and Illinois mines for all-rail shipment	$17.00
Same grade for Ohio River barge shipment for Kentucky and Illinois River landings	18.50
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines	$17.50 to 18.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic port, duty paid	19.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	30.00

Iron and Steel Scrap

PITTSBURGH

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$13.00 to $13.50
No. 2 heavy melting steel	11.50 to 12.00
No. 2 railroad wrought	13.00 to 13.50
Scrap rails	13.50 to 14.00
Rails 3 ft. and under	15.50 to 16.00
Sheet bar crops, ordinary	15.00 to 15.50
Compressed sheet steel	12.50 to 13.00
Hand bundled sheet steel	11.50 to 12.00
Hvy. steel axle turnings	12.00 to 12.50
Machine shop turnings	8.75 to 9.25
Short shov. steel turnings	8.75 to 9.25
Short mixed borings and turnings	8.50 to 9.00
Cast iron borings	8.50 to 9.00
Cast iron carwheels	12.50 to 13.00
Heavy breakable cast	11.50 to 12.00
No. 1 cast	13.00 to 13.50
Rails, knuckles and coupliers	15.50 to 16.00
Rail coil and leaf springs	15.50 to 16.00
Rolled steel wheels	15.50 to 16.00
Low phos. billet crops	16.50 to 17.00
Low phos. sheet bar crops	16.00 to 16.50
Low phos. plate scrap	15.00 to 15.50
Low phos. punchings	15.50 to 16.00
Steel car axles	16.50 to 17.00

CHICAGO

Delivered Chicago district consumers:

	Per Gross Ton
Heavy melting steel	$11.00 to $11.50
Automobile hvy. melt. steel	10.25 to 10.75
Shoveling steel	$11.00 to $11.50
Hydraulic comp. sheets	10.25 to 10.75
Drop forge flashings	9.25 to 9.75
No. 1 busheling	10.00 to 10.50
Rolled carwheels	12.00 to 12.50
Railroad ties	12.00 to 12.50
Railroad leaf springs	12.00 to 12.50
Axle turnings	9.00 to 9.50
Steel couples and knuckles	11.75 to 12.25
Coil springs	12.25 to 12.75
Axle turnings (elec. fur.)	10.00 to 10.50
Low phos. punchings	11.75 to 12.25
Low phos. plates, 12 in. and under	11.75 to 12.25
Cast iron borings	6.75 to 7.25
Short shoveling turnings	6.75 to 7.25
Machine shop turnings	6.50 to 7.00
Rerolling rails	12.25 to 12.75
Steel rails, less than 3 ft.	12.25 to 12.75
Steel rails, less than 2 ft.	12.75 to 13.25
Angle bars, steel	12.00 to 12.50
Cast iron carwheels	11.50 to 12.00
Railroad malleable	11.75 to 12.25
Agricultural malleable	9.75 to 10.25

	Per Net Ton
Iron car axles	$12.50 to $13.00
Steel car axles	11.75 to 12.25
No. 1 railroad wrought	9.00 to 9.50
No. 2 railroad wrought	9.75 to 10.25

No. 2 busheling	$4.00 to	$4.50
Locomotive tires, smooth	10.00 to	10.50
Pipe and flues	5.25 to	5.75
No. 1 machinery cast	9.25 to	9.75
Clean automobile cast	8.75 to	9.25
No. 1 railroad cast	8.75 to	9.25
No. 1 agricultural cast	7.75 to	8.25
Stove plate	7.25 to	7.75
Grate bars	6.25 to	6.75
Brake shoes	8.25 to	8.75

PHILADELPHIA

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$11.00 to	$11.50
No. 2 heavy melting steel	9.00 to	9.50
No. 1 railroad wrought	12.00 to	13.00
Bundled sheets	....	9.50
Hydraulic compressed, new	....	10.00
Hydraulic compressed, old	8.00 to	8.50
Machine shop turnings	6.50 to	7.00
Heavy axle turnings	9.50 to	10.00
Cast borings	5.50 to	6.00
Heavy breakable cast	11.00 to	11.50
Stove plate (steel works)	8.50 to	9.00
No. 1 low phos. heavy	15.00 to	15.50
Couplers and knuckles	14.00 to	15.00
Rolled steel wheels	14.00 to	15.00
No. 1 blast furnace	5.50 to	6.00
Spec. iron and steel pipe	9.00 to	9.50
Shafting	16.00 to	16.50
Steel axles	....	14.50
No. 1 forge fire	10.00 to	11.00
Cast iron car wheels	12.50 to	13.00
No. 1 cast	12.00 to	13.00
Cast borings (chem.)	12.00 to	14.00
Steel rails for rolling	....	13.00

CLEVELAND

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$11.25 to	$11.75
No. 2 heavy melting steel	10.75 to	11.25
Compressed sheet steel	10.50 to	11.00
Light bundled sheet stampings	8.50 to	9.00
Drop forge flashings	10.50 to	11.00
Machine shop turnings	9.00 to	9.50
Short shoveling turnings	8.75 to	9.25
No. 1 bushel'ng	10.00 to	10.50
Steel axle turnings	9.50 to	10.00
Low phos. billet crops	14.25 to	14.75
Cast iron borings	8.75 to	9.25
Mixed borings and short turnings	8.75 to	9.25
No. 2 busheling	8.75 to	9.25
No. 1 cast	12.00 to	12.50
Railroad grate bars	7.50 to	8.00
Stove plate	7.00 to	7.50
Rails under 3 ft.	15.00 to	15.50
Rails for roll'ng	16.50 to	17.00
Railroad malleable	12.00 to	12.50
Cast iron carwheels	....	12.25

BUFFALO

Per gross ton, f.o.b. Buffalo consumers' plants:

No. 1 heavy melting steel	$11.50 to	$12.00
No. 2 heavy melting scrap	10.00 to	10.50
Scrap rails	11.00 to	11.50
New hydraul. comp. sheets	10.00 to	10.50
Old hydraul. comp. sheets	9.00 to	9.50
Drop forge flashings	10.00 to	10.50
No. 1 busheling	10.00 to	10.50
Hvy. steel axle turnings	8.00 to	8.50
Machine shop turnings	5.50 to	6.00
Knuckles and couplers	13.00 to	13.50
Coil and leaf springs	13.00 to	13.50
Rolled steel wheels	13.00 to	13.50
Low phos. billet crops	13.00 to	13.50
Short shov. steel turnings	6.50 to	7.00
Short mixed borings and turnings	6.50 to	7.00
Cast iron borings	6.50 to	7.00
No. 2 busheling	6.50 to	7.00
Steel car axles	12.00 to	12.50
Iron axles	12.00 to	12.50
No. 1 machinery cast	12.50 to	12.50
No. 1 cupola cast	10.00 to	10.50
Stove plate	9.50 to	9.75
Steel rails, 3 ft. and under	13.50 to	14.00
Cast iron carwheels	11.50 to	12.00
Industrial malleable	11.50 to	12.00
Railroad malleable	11.50 to	12.00
Chemical borings	8.50 to	9.00

BIRMINGHAM

Per gross ton delivered consumers' yards:

Heavy melting steel	....	$10.00
Scrap steel rails	....	9.00
Short shoveling turnings	....	5.50
Stove plates	$7.00 to	7.50
Steel axles	10.50 to	11.00
Iron axles	10.50 to	11.00
No. 1 railroad wrought	....	7.00
Rails for rolling	....	10.50
No. 1 cast	9.00 to	9.50
Tramcar wheels	9.00 to	9.50
Cast iron borings, chem.	....	8.00

ST. LOUIS

Per gross ton delivered consumers' yards:

Selected heavy steel	$9.00 to	$9.50
No. 1 heavy melting	9.00 to	9.50
No. 2 heavy melting	8.00 to	8.50
No. 1 locomotive tires	9.50 to	10.00
Misc. stand.-sec. rails	9.25 to	9.75
Railroad springs	11.00 to	11.50
Bundled sheets	7.25 to	7.75
No. 2 railroad wrought	9.00 to	9.50
No. 1 busheling	6.25 to	6.75
Cast iron borings and shoveling turnings	5.00 to	5.50
Rails for rolling	10.75 to	11.25
Machine shop turnings	4.75 to	5.25
Heavy turnings	6.00 to	6.50
Steel car axles	10.50 to	11.00
Iron car axles	13.00 to	13.50
No. 1 railroad wrought	6.00 to	6.50
Steel rails less than 3 ft.	11.50 to	12.00
Steel angle bars	9.75 to	10.25
Cast iron carwheels	8.00 to	8.50
No. 1 machinery cast	9.00 to	9.50
Railroad malleable	9.50 to	10.00
No. 1 railroad cast	8.50 to	9.00
Stove plate	6.50 to	7.00
Agricult. malleable	9.00 to	9.50

BOSTON

Dealers' buying prices per gross ton:

No. 1 heavy melting steel	$7.25 to	$7.50
Scrap T rails	7.25 to	7.50
No. 2 steel	5.75 to	6.00
Breakable cast	6.50 to	6.75
Machine shop turnings	3.25 to	3.50
Bundled skeleton, long	5.50 to	5.80
Forge flashings	5.50 to	5.80
Blast furnace scrap	2.75 to	3.00
Shafting	11.00 to	11.25
Steel car axles	10.50 to	11.00
Wrought pipe	5.00 to	5.25
Cast iron borings, chemical	8.00 to	8.50
Stove plate	....	6.50

Per gross ton delivered consumers' yards:

Textile cast	$8.75 to	$9.00
No. 1 machinery cast	9.50 to	10.00
Railroad malleable	11.00 to	11.50

NEW YORK

Dealers' buying prices per gross ton:

No. 1 heavy melting steel	....	$9.00
No. 2 heavy melting steel	....	7.50
Heavy breakable cast	$7.50 to	8.00
No. 1 machinery cast	....	8.00
No. 2 cast	6.50 to	7.00
Stove plate	....	6.00
Steel car axles	10.75 to	11.50
No. 1 railroad wrought	7.50 to	8.00
No. 1 yard wrought, long	6.50 to	7.00
Spec. iron and steel pipe	$4.50 to	$5.00
Forge fire	5.50 to	6.00
Rails for rerolling	9.50 to	10.00
Short shoveling turnings	3.00 to	4.00
Machine shop turnings	3.50 to	4.00
Cast borings	4.50 to	4.75
No. 1 blast furnace	2.50 to	4.00
Cast borings (chemical)	11.00 to	11.50
Unprepared yard iron and steel	4.50 to	5.00

Per gross ton, delivered local foundries:

No. 1 machinery cast	$11.50
No. 1 hvy. cast (cupola size)	10.50
No. 2 cast	9.00

CINCINNATI

Dealers' buying prices per gross ton:

Heavy melting steel	$8.25 to	$9.00
Scrap rails for melting	9.00 to	9.50
Loose sheet clippings	4.75 to	5.25
Bundled sheets	6.50 to	7.00
Cast iron borings	6.00 to	6.50
Machine shop turnings	5.50 to	6.00
No. 1 busheling	7.00 to	7.50
No. 2 busheling	3.50 to	4.00
Rails for rollings	9.50 to	10.00
No. 1 locomotive tires	9.00 to	9.50
Short rails	11.75 to	12.25
Cast iron carwheels	8.25 to	8.75
No. 1 machinery cast	9.50 to	10.00
No. 1 railroad cast	9.00 to	9.50
Burnt cast	6.50 to	7.00
Stove plate	6.50 to	7.00
Agricultural malleable	8.50 to	9.00
Railroad malleable	8.50 to	9.00

DETROIT

Dealers' buying prices per gross ton:

Heavy melting steel	$8.50 to	$9.00
Borings and short turnings	6.50 to	7.00
Long turnings	5.75 to	6.25
No. 1 machinery cast	10.00 to	10.50
Automotive cast	11.00 to	11.50
Hydraul. comp. sheets	9.00 to	9.50
Stove plate	7.50 to	8.00
New factory busheling	7.75 to	8.25
Old No. 2 busheling	5.50 to	6.00
Sheet clippings	5.00 to	5.50
Flashings	7.50 to	8.00
Low phos. plate scrap	9.00 to	9.50

CANADA

Dealers' buying prices per gross ton:

	Toronto	Montreal
Heavy melting steel	$5.50	$5.50
Rails scrap	6.00	4.50
Machine shop turnings	2.50	2.50
Boiler plate	4.50	4.50
Heavy axle turnings	2.50	2.50
Cast borings	3.00	3.00
Steel borings	2.00	2.00
Wrought pipe	2.50	2.50
Steel axles	4.50	6.00
Axles wrought iron	4.50	6.50
No. 1 machinery cast	7.75	9.00
Stove plate	4.50	5.00
Standard carwheels	7.25	7.00
Malleable	6.75	7.00

Warehouse Prices for Steel Products

PITTSBURGH

	Base per Lb.
Plates	3.20c
Structural shapes	3.20c
Soft steel bars and small shapes	3.00c
Reinforcing steel bars	3.00c
Cold-finished and screw stock—	
Rounds and hexagons	*3.45c
Squares and flats	*3.45c
Hoops and bands under ¼ in.	3.35c
Hot-rolled annealed sheets (No. 24), 25 or more bundles	3.55c
Galv. sheets (No. 24), 25 or more bundles	4.10c
Hot-rolled sheets (No. 10)	3.10c
Galv. corrug. sheets (No. 28), per square (more than 3750 lb.)	$3.32
Spikes, large	2.90c
Track bolts, all sizes, per 100 count, 65 per cent off list.	
Machine bolts, 100 count, 65 per cent off list.	
Carriage bolts, 100 counts, 65 per cent off list.	
Nuts, all styles, 100 count, 65 per cent off list.	
Large rivets, base per 100 lb.	$3.50
Wire, black, soft ann'l'd, base per 100 lb.	*2.70c
Wire, galv. soft, base per 100 lb.	*2.925c
Common wire nails, per keg	*2.834c
Cement coated nails, per keg	*2.834c

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applied to orders of 400 to 9999 lb.

*Delivered in Pittsburgh switching district.

CHICAGO

	Base per Lb.
Plates and structural shapes	3.10c
Soft steel bars	2.90c
Cold-fin. steel bars and shafting	
Rounds and hexagons	3.50c
Flats and squares	3.50c
Bands, 3/16 in. (in Nos. 10 and 12 gages)	3.30c
Hoops (No. 14 gage and lighter)	3.20c
Hot-rolled annealed sheets (No. 24)	3.85c
Galv. sheets (No. 24)	4.45c
Hot-rolled sheets (No. 10)	2.85c
Spikes (9/16 in. and lighter)	3.50c
Track bolts	4.65c
Rivets, structural (keg lots)	3.50c
Rivets boiler (keg lots)	3.60c

	Per Cent Off List
Machine bolts	60 and 5
Carriage bolts	60 and 5
Coach and lag screws	60 and 5
Hot-pressed nuts, sq. tap. or blank	60 and 5
Hot-pressed nuts, hex. tap or blank	60 and 5
Hex. head and cap screws	80
Cup. point set screws	70
Flat head bright wood screws	37½ and 10
Spring cotters	50
Stove bolts in full packages	70 and 10
Rd. hd. tank rivets, 7/16 in. and smaller	5?½
Wrought washers	$5.50 off list
No. 8 black ann'l'd wire per 100 lb.	$3.85
Com. wire nails, base per keg	3.05c
Cement c't'd nails, base per keg	3.05c

NEW YORK

	Base per Lb.
Plates, ¼ in. and heavier	3.45c
Structural shapes	3.42c
Soft steel bars, small shapes	3.39c
Iron bars	3.24c
Iron bars, swed. charcoal	6.50 to 7.25c
Cold-fin. shafting and screw stock:	
Rounds and hexagons	3.92c
Flats and squares	4.42c
Cold-roll. strip, soft and quarter hard	3.59c
Hoops	3.67c
Bands	3.67c
Hot-rolled sheets (No. 10)	3.49c
Hot-rolled ann'l'd sheets (No. 24*)	4.05c
Galvanized sheets (No. 24*)	4.65c
Long terne sheets (No. 24)	5.40c
Standard tool steel	11.00c
Wire, black annealed (No. 10)	3.30c
Wire, galv. (No. 10)	3.80c
Tire steel, 1 x ½ in. and larger	3.65c
Open hearth spring steel	4.00c to 10.00c
Common wire nails, base, per keg	$3.25

	Per Cent Off List
Machine bolts, cut thread:	
Up to 1 in. dia. inclusive	60
Over 1 in. dia.	50
Carriage bolts, cut thread:	
Up to ½ in. dia. inclusive	60
Over ½ in. dia.	50

	Per 100 Ft.
Boiler tubes:	
Lap welded, 2-in.	$18.05
Seamless welded, 2-in.	19.24
Charcoal iron, 2-in.	24.94
Charcoal iron, 4-in.	63.65

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

ST. LOUIS

	Base per Lb.
Plates and struc. shapes	3.49c
Bars, soft steel or iron	3.29c
Cold-fin. rounds, shafting, screw stock	3.74c
Hot-rolled annealed sheets (No. 24)	3.94c
Galv. sheets (No. 24)	4.54c
Hot-rolled sheets (No. 10)	3.44c
Black corrug. sheets (No. 24)	3.99c
*Galv. corrug. sheets	4.59c
Structural rivets	3.84c
Boiler rivets	3.94c

	Per Cent Off List
Tank rivets, 7/16 in. and smaller	60
Machine and carriage bolts, lag screws, fittings up bolts, bolt ends, plow bolts, hot-pressed nuts, square and hexagon, tapped or blank, semi-finished nuts	
1000 lb. or over	60
200 to 999 lb.	55 and 5
100 to 199 lb.	50 and 5
Less than 100 lb.	50

*No. 26 and lighter take special prices.

PHILADELPHIA

	Base per Lb.
*Plates, ¼-in. and heavier	3.00c
*Structural shapes	3.00c
*Soft steel bars, small shapes, iron bars (except bands)	3.00c
‡Reinforc. steel bars, sq. twisted and deformed	2.955c
Cold-finished steel bars	3.73c
*Steel hoops	3.55c
*Steel bands, No. 12 and 3/16 in., incl.	3.30c
Spring steel	5.00c
†Hot-rolled anneal. sheets (No. 24)	3.80c
†Galvanized sheets (No. 24)	4.40c
*Hot-rolled annealed sheets (No. 10)	3.20c
Diam. pat. floor plates, ¼ in.	5.00c
Swedish iron bars	6.25c

These prices are subject to quantity differentials except on reinforcing and Swedish iron bars.

*Base prices subject to deduction on orders aggregating 4000 lb. or over.

†For 50 bundles or over.

‡For less than 2000 lb.

CLEVELAND

	Base per Lb.
Plates and struc. shapes	3.36c
Soft steel bars	3.05c
Reinforc. steel bars	*2.10c
Cold-finished steel bars	3.40c
Flat rolled steel under ¼ in.	3.51c
Cold-finished strip	‡3.20c
Hot-rolled annealed sheets (No. 24)	3.76c
Galvanized sheets (No. 24)	4.36c
Hot-rolled sheets (No. 10)	3.26c
Hot-rolled 3/16 in. 24 to 48 in. wide sheets	3.61c
Black ann'l'd wire, per 100 lb.	$2.65
No. 9 galv. wire, per 100 lb.	3.00
Com. wire nails, base per keg	2.40

*Plus mill, size and quantity extras.

†Outside delivery 10c. less.

CINCINNATI

	Base per Lb.
Plates and struc. shapes	3.45c
Bars, soft steel or iron	3.25c
New billet reinforc. bars	3.10c
Rail steel reinforc. bars	3.10c
Hoops and bands, 3/16 in. and lighter	3.60c
Cold-finished bars	3.70c
Hot-rolled annealed sheets (No. 24)	4.25c
Galv. sheets (No. 24)	4.85c
Hot-rolled sheets (No. 10)	3.35c
Structural rivets	4.35c

	Net per 100 Ft.
Small rivets	55 per cent off list
No. 9 ann'l'd wire, per 100 lb.	$3.00
Com. wire nails, base per keg (10 to 49 kegs)	2.65
Larger quantities	2.50
Cement c't'd nails, base 100-lb. keg.	2.95
Chain, 1-in., per 100 lb.	8.35

	Net per 100 Ft.
Seamless steel boiler tubes, 2-in.	$17.89
4-in.	41.69
Lap-welded steel boiler tubes, 2-in.	16.61
4-in.	38.72

BUFFALO

	Base per Lb.
Plates	3.40c
Struc. shapes	3.30c
Soft steel bars	3.10c
Reinforcing bars	2.10c
Cold-fin. flats and sq.	3.55c
Round and hex.	3.55c
Cold-rolled strip steel	5.25c
Hot-rolled annealed sheets (No. 24)	4.05c
Heavy hot-rolled sheets, 3/16 in., 24 to 48 in. wide	3.67c
Galv. sheets (No. 24)	4.65c
Bands	3.57c
Hoops	3.57c
Hot-rolled unannealed sheets	3.32c
Com. wire nails, base per keg	$3.00
Black wire, base per 100 lb.	3.45c

BOSTON

	Per Lb.
Beams, channels, angles, tees, zees	3.42c.
H beams and shapes	3.42c.
Plates—sheared, tank and univ. mill, ¼ in. thick and heavier	3.43c.
Floor plates, diamond pattern	5.18c.
Bar and bar shapes (mild steel)	3.25c.
Bands 3/16 in. thick and No. 12 ga. incl.	3.50c. to 4.50c.
Half rounds, half ovals, ovals and bevels	4.50c.
Tire steel	4.50c.
Cold-finished rounds and hexagons	3.70c.
Cold-rolled strip steel	5.20c.
Cold-finished squares and flats	4.20c.
Blue annealed sheets, No. 10 ga.	3.25c.
One pass cold-rolled sheets No. 24 ga.	3.50c.
Galvanized steel sheets, No. 24 ga.	4.60c.
Lead coated sheets, No. 24 ga.	5.65c.

Prices delivered by truck in metropolitan Boston, subject to quantity differentials.

PACIFIC COAST

	Base per Lib.		
	San Francisco	Los Angeles	Seattle
Plates, tank and U. M.	3.55c.	3.70c.	3.55c.
Shapes, standard	3.55c.	3.70c.	3.55c.
Soft steel bars	3.60c.	3.70c.	3.55c.
Reinforcing bars	3.50c.	3.50c.	3.50c.
Hot-rolled annealed sheets (No. 24)	4.40c.	4.35c.	4.40c.
Hot-rolled sheets (No. 10)	3.75c.	3.80c.	3.75c.
Galv. sheets (No. 24)	5.00c.	5.05c.	5.00c.
Cold finished steel			
Rounds	5.95c.	5.95c.	4.75c.
Squares and hexagons	7.20c.	7.20c.	6.00c.
Flats	7.70c.	7.70c.	7.00c.
Common wire nails —base per keg less carload	$3.40	$3.25	$3.35

All items subject to differentials for quantity.

Cor-Ten and Aluminum For New B. & O. Trains

THE Baltimore & Ohio Railroad has placed orders with the American Car & Foundry Co. for 16 passenger cars, eight of which will be built of aluminum alloy and eight of USSS Cor-Ten steel, a low-chromium steel developed by the United States Steel Corpn. which has a high elastic limit, high tensile strength and corrosion resistance.

These cars will be used to make up two stream-line trains, one of which will be drawn by a 4-4-4 type steam locomotive which is being rebuilt to conform with stream-line principles in the railroad's own shops. The other train will be propelled by an 1800-hp. Diesel electric locomotive which is yet to be purchased. Each train will consist of a locomotive and six cars, two car of each type of construction being held in reserve.

The cars in each train will be of the following types: One combination passenger and baggage, two reclining seat cars, one combination lounge and diner, one chair car and one observation chair car. The three coaches will seat 176 passengers and the chair and observation car will seat 32 each, making a total of 240 passengers for each train. The trains will not be articulated. Each car will have a four-wheel truck at each end.

Both the steam and the Diesel electric engines will be able to haul their trains 90 to 100 miles an hour, engineers state, although it is not expected that it will be necessary to operate at this speed on regular schedules.

The railroad has been allotted $900,000 by the PWA to construct the two trains. This is the second PWA allotment for high-speed train construction, the first being $400,000 to the New York, New Haven & Hartford for a four-car articulated train to operate between Boston and Providence.

Plans for International Foundry Congress

OVERSEAS associations to be represented in the International Foundry Congress which will be held in Philadelphia in the week of Oct. 22 will include the following: Institute of British Foundrymen, French Foundry Technical Association, German Association, Belgian Technical Foundry Association, Czechoslovakian Foundry Association, Italian Foundry Association and Australian Bureau of Steel Manufacturers. Among the technical contributions expected is one from Dr. W. H. Hatfield, British authority on cast iron; a Belgian association paper on the "Castability of Metals," and an Italian exchange paper on easily machined iron of high silicon content. The American Society for Testing Materials will join the American Foundrymen's Association in one or more sessions at which testing cast metals will be the topic. Much is expected of the exhibits, for which unusual facilities are available in the new Philadelphia Convention Hall.

For sessions on steel castings, factors affecting the soundness of castings will be stressed and also comparison of test data on bars cut from separate cast coupons and from castings.

The non-ferrous division is planning a second symposium on deoxidation and degasification of non-ferrous alloys, and will have, in addition, papers on porosity in leaded bronze bushings, physical properties of high nickel bronzes, and effects of elevated temperatures on certain aluminum alloys used in aircraft.

For the malleable casting session, two research papers have been scheduled, one on metallography of annealing, and one on effect of copper in malleable cast iron.

Two sessions on foundry refractories, one session on materials handling and equipment maintenance, sessions on sand control, apprentice training, and shop operation courses will complete the program.

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Quotations on Prime Western and Straits Tin Drop to Lower Levels

Blue Eagle Electrolytic Copper Continues Unchanged at 8.50c.—Lead Demand Is Maintained—Tin Inactive at 54.05c.

NEW YORK, May 8.—Sellers and buyers of Blue Eagle electrolytic copper in the domestic market are almost inactive pending complete clarification of marketing provisions of the code. Pursuant to the first resolution adopted by the code authority on May 1, all non-Blue Eagle metal has been withdrawn from the domestic market until further consideration can be given to the particular problems involved. All interested parties have until May 22 to reach a decision regarding the selling of copper below the Blue Eagle price, and until the decision is forthcoming the code bases will apply for all transactions. The present market is steady at 8.50c. and 8.62½c. a lb., Connecticut valley, for electrolytic and Lake metal respectively. There is considerable sentiment in the industry for higher prices, and, inasmuch as many primary producers have booked the bulk of their May quotas, there is considerable probability that a 9c. basis will prevail within the next month. Foreign producers are somewhat alarmed at marketing developments here, as they believe that firmer competition may result. However prices abroad have continued downward, and moderate lots changed hands this morning at equivalent cent prices from 8.10c. to 8.12½c. a lb., c.i.f. usual Continental base ports.

Tin

The market abroad has been weakened by the announcement of a 10 per cent increase in export quotas for the April-September period. English and Far East postings eased off £3 to £5 and New York metal has declined more than 80 points to today's level of 54.05c. a lb. Domestic consumers are not particularly in need of metal and are continuing to withhold buying orders with the hope of taking advantage of additional market breaks. The buffer pool is now almost a certainty abroad, and its acceptance means an attempt to control prices in addition to the usual output control.

Lead

This market is featureless, with moderate daily demands from all consuming outlets and a steady price level of 4.25c., New York, and 4.10c. a lb., St. Louis. The bulk of May requirements are now covered, as aggregate bookings total 25,000 tons, and June commitments amount to only 6000 tons. The statistical position was materially improved in April, and sellers look forward to increasing shipments with a probable reflection in moderately higher quotations.

Zinc

Spelter continued in light demand throughout the week, and sporadic weakness last Friday occasioned a general 5-point price reduction on Monday. With the exception of a few July-August lots, last week's sales of 2600 tons were made on a basis of 4.40c. a lb., as compared with 2000 tons in the preceding week, and 3900 tons booked a fortnight ago. O. W. Roskill in his annual address before the Zinc Institute stressed the excellent intrinsic position of spelter and attributed the daily fluctuations to the influence of outside factors. Nevertheless the current buying support is not particularly encouraging, nor is the firm position of Tri-State ore much help in establishing profitable conversion. Joplin concentrates are still firmly priced at $29 to $30 a ton, and sales for the week totaled over 5000 tons. Output last week amounted to 3000 tons, shipments were 5500 tons, and stocks at the end of the week were over 2000 tons down at 11,400 tons.

Antimony

A highly buoyant condition in China has reflected in a 135-point advance in Chinese 99 per cent at New York since March 1. The present market is nominally quoted at 8.60c. to 8.70c. a lb., but domestic demand is almost negligible, inasmuch as many buyers believe the high offerings in China will not be sustained.

The Week's Prices. Cents Per Pound for Early Delivery

	May 2	May 3	May 4	May 5	May 7	May 8
Electrolytic copper, N. Y.*‡	8.25	8.25	8.25	8.25	8.25	8.25
Lake copper, Eastern delivery*	8.62½	8.62½	8.62½	8.62½	8.62½	8.62½
Electrolytic copper, Connecticut†						
Straits tin, Spot, N. Y.	54.87½	54.25	54.00	....	54.20	54.05
Zinc, East St. Louis	4.40	4.40	4.40	4.40	4.35	4.35
Zinc, New York	4.75	4.75	4.75	4.75	4.70	4.70
Lead, St. Louis	4.10	4.10	4.10	4.10	4.10	4.10
Lead, New York	4.25	4.25	4.25	4.25	4.25	4.25

* Blue Eagle copper. † Outside market. ‡ Price ¼c. higher in Connecticut Valley.

Aluminum, 98-99 per cent, 22.90c. a lb. delivered.
Aluminum, remelt No. 12 (alloy), carload lots delivered, 15.50c. a lb., average for week.
Nickel electrolytic cathode, 35c. a lb., delivered; shot and ingot, 36c. a lb., delivered.
Antimony, 8.60c. a lb., New York.
Brass ingots, 85-5-5-5; 8.75c. a lb., New York and Philadelphia.

From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits pig	56.00c. to 57.00c.
Tin, bar	58.00c. to 59.00c.
Copper, Lake	9.75c. to 10.50c.
Copper, electrolytic	9.50c. to 10.00c.
Copper, castings	9.25c. to 10.25c.
*Copper sheets, hot-rolled	15.50c.
*High brass sheets	14.25c.
*Seamless brass tubes	16.75c.
*Seamless copper tubes	16.75c.
*Brass rods	12.75c.
Zinc, slabs	5.75c. to 6.75c.
Zinc sheets (No. 9), casks, 1200 lb. and over	10.25c.
Lead, American pig	5.00c. to 6.00c.
Lead, bar	6.00c. to 7.00c.
Lead, sheets	8.00c.
Antimony, Asiatic	9.75c.
Alum., virgin, 99 per cent, plus	23.30c.
Alum., No. 1 for remelting, 98 to 99 per cent	18.00c. to 19.00c.
Solder, ½ and ½	33.00c. to 34.00c.
Babbitt metal, commercial grades	25.00c. to 60.00c.

*These prices are also for delivery from Chicago and Cleveland warehouses.

From Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits pig	57.25c.
Tin, bar	59.25c.
Copper, Lake	9.50c.
Copper, electrolytic	9.50c.
Copper, castings	9.25c.
Zinc, slab	5.75c. to 6.00c.
Lead, American pig	5.10c. to 5.35c.
Lead, bar	8.00c.
Antimony, Asiatic	9.00c.
Babbitt metal, medium grade	19.50c.
Babbitt metal, high grade	61.25c.
Solder, ½ and ½	35.00c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	6.75c.	7.50c.
Copper, hvy. and wire	6.50c.	7.25c.
Copper, light and bottoms	5.50c.	6.50c.
Brass, heavy	3.62½c.	4.37½c.
Brass, light	3.12½c.	3.75c.
Hvy. machine composition	5.25c.	6.125c.
No. 1 yel. brass turnings	4.50c.	5.25c.
No. 1 red brass or compos. turnings	4.37½c.	5.37½c.
Lead, heavy	3.25c.	3.75c.
Zinc	2.50c.	3.125c.
Cast aluminum	10.00c.	11.75c.
Sheet aluminum	12.25c.	13.50c.

Non-Ferrous Averages

THE average prices of the major non-ferrous metals for April, based on daily quotations in THE IRON AGE, are as follows:

	Average
Electrolytic copper, N. Y.*	8.16c. a lb.
Lake copper, New York	8.43c. a lb.
Straits tin, Spot, N. Y.	55.66c. a lb.
Zinc, East St. Louis	4.37c. a lb.
Zinc, New York	4.72c. a lb.
Lead, St. Louis	4.05c. a lb.
Lead, New York	4.18c. a lb.

*Refinery quotations: price ¼c. higher delivered in Connecticut.

Reinforcing Steel

Awards 4860 Tons—New Projects 1360 Tons

AWARDS

Greenwich, Conn., 100 tons, bridge, to Truscon Steel Co.

Tarrant County, Tex., 160 tons, bridge, to North Texas Iron & Steel Co.

State of Illinois, 100 tons, road work, to Concrete Steel Co.

Fort Peck, Mont., 3800 tons, to an unnamed bidder.

North Bend, Ore., 200 tons, unit B of Coos Bay bridge, to Virginia Bridge & Iron Co.

Sitka, Alaska, 100 tons, Pioneers' Home, to Pacific Coast Steel Corpn.

Boulder Dam, 150 tons, to Pacific Coast Steel Corpn.

State of Colorado, 120 tons, highway work in 11 counties, to unnamed bidders.

State of California, 125 tons, highway work in seven counties, to unnamed bidders.

NEW REINFORCING BAR PROJECTS

Dover, N. H., 250 tons, bridge.

State of Indiana, tonnage not stated, paving; bids to be opened May 15.

State of Illinois, 200 tons, road work.

Escanaba, Mich., unstated tonnage; new $3,500,000 ore dock for Chicago & North Western Railroad; PWA funds allotted.

St. Louis, 450 tons, addition to city hospital; H. B. Deal & Co., Inc., general contract.

Oakland, Cal., 460 tons, material for East Bay Municipal Utilities District; bids under advisement.

Boston & Maine Gets Third PWA Loan

WASHINGTON, May 8.—The Boston & Maine Railroad has contracted for a PWA loan of $1,550,000 to be used for a general program of roadway improvement. It is estimated that $797,186 will be used to buy materials.

This is the third PWA loan made to the Boston & Maine and it is stated that a fourth contract calling for a loan of $2,628,000 is in the course of preparation and will be used for the purchase of new locomotives and cars. The total for all four loans will be $7,318,000.

Specifications for Coal Published

SPECIFICATIONS for the classification of coals according to rank and grade have been prepared by a committee sponsored by the American Society for Testing Materials and functioning under the procedure of the American Standards Association. These specifications are being submitted to the A.S.T.M. for approval as tentative. In classification by rank, the coals are broadly divided into four classes. These classes are subdivided into 13 groups, according to fixed carbon and B.t.u. values. Copies of the preprinted report of the sectional committee, including the specifications, all to be presented at the annual meeting of the A.S.T.M. at Atlantic City, N. J., in June, can be obtained from A.S.T.M. headquarters, 260 South Broad Street, Philadelphia, at 25c. each.

Living Costs Lower During April

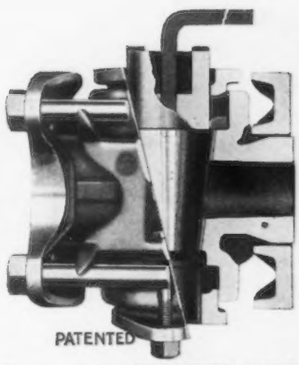
A REDUCTION of 0.1 per cent in living costs occurred in April, according to the monthly survey of the National Industrial Conference Board. Declines in food and coal prices slightly more than offset advances in rents, clothing, and sundries. The cost of living of wage-earners in April was 9.7 per cent higher than in April, 1933, but it was 20.9 per cent lower than in April, 1929.

The purchasing value of the dollar was 127.6 cents in April, as compared with 127.4 cents in March, 139.9 cents in April, 1933, and 100 cents in 1923.

The electrodeposition of indium was the subject of a brief paper contributed to the Electrochemical Society by Daniel Gray, technical director, Indium Corpn. of America, Utica, N. Y. It discussed experiments preliminary to solving the problem of depositing indium-silver alloys. The indium deposit itself is of a satin-like texture, very soft and nearly silver white.

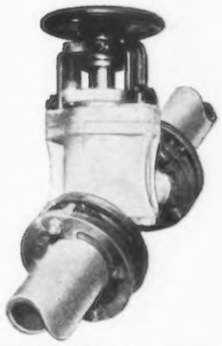
The Perin Engineering Co., Inc., Charles P. Perin, president, and Frank L. Estep, vice-president, has moved to twenty-sixth floor of 535 Fifth Avenue, New York.

For acid and/or abrasive solutions . . . Most valves either eat out or wear out quickly Duriron Valves will not corrode nor wear.



Cross-section DURIRON "PR" Plug Valve

That may be a bit strong. Perhaps we should say they will last a goshawful long time handling your acids and acid sludges. Because Duriron Valves ("*Durichlor*" for Muriatic Acid) can stand up and take it from almost any acid without very much depreciation over a long period of years.



DURIRON Y Valves in sizes from 1 to 6"

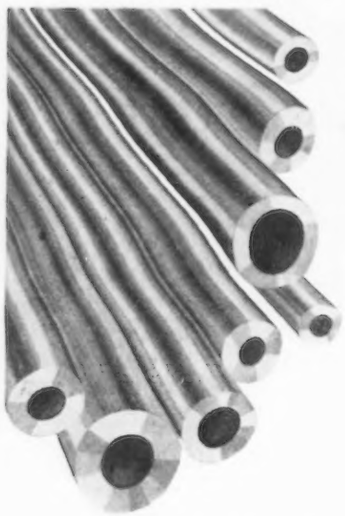
And as Duriron is so very hard, the abrasive solids in the solution just manage to shine it up somewhat. Duriron is used for handling polishing rouge, and you know how abrasive that is.

Duriron Valves are made in several types and sizes. We'll be glad to suggest the particular type that will best serve you.

Also glad to send you Bulletin 161—Valves—If you want it.

THE DURIRON COMPANY, Inc.

438 N. Findlay Street **Dayton, Ohio**



TOOL STEEL TUBING

NON-SHRINK
OIL HARDENING
NON-DEFORMING

for RING DIES
CUTTING DIES
SPACERS, BUSHINGS, Etc.

Manufacturers of BISCO Tungsten Carbide drawing dies for wire, rod and tubing.

THE BISSETT STEEL CO., INC.
945 E. 67th ST. CLEVELAND, OHIO
Cincinnati Worcester Buffalo

Johnson Expects Slight Steel Code Amendments

WASHINGTON, May 8.—General Hugh S. Johnson today said that he did not think there is any question but that the steel code is going to be slightly amended and extended beyond May 31. He would not state what the proposed amendments are. His statement that they would be only "slight" created some surprise in view of his statement some time ago that the basing point system was wrong and indicating it would be suggested by NRA that it be either abolished or considerably broadened.

When asked at the press conference today if the Federal Trade Commission's recommendations in its report on the steel code would be followed, the General replied that NRA has been making its own studies.

Amalgamated Issues Strike Ultimatum

AMALGAMATED Association of Iron, Steel and Tin Workers will file demands upon the steel industry on May 26 for recognition of the union, which is an affiliate of the A. F. of L. In the event of an unfavorable answer by the steel companies by June 20, the threat is made of a general strike. The demands include both recognition of the union and the installation of the check-off.

The decision to present this ultimatum was made upon the last day of the convention of the Amalgamated recently held in Pittsburgh and is believed to be contrary to the best judgment of the more conservative element in the union.

Labor Board Orders Duquesne Plant Election

WASHINGTON, May 8.—The National Labor Board has decided that an election shall be held at the Duquesne plant of the Carnegie Steel Co., to determine employee representation. The form, method and procedure of the election are not yet decided by the board but will be announced later.

Action of the board is said to have been based upon a petition signed by 1500 of the company's employees.

In an election held in March at Duquesne to determine the desire of employees with respect to adoption of a revised employee representation plan, a total vote was cast of 2846, of which 65 per cent was in favor of the plan and 26 per cent against it, after eliminating 244 voided ballots.

It is believed that the action of the Labor Board, in ordering a new election, was due to the activities of the Amalgamated Association which immediately prior to the last election at the Carnegie plants presented the usual charges of interference and intimidation.

TRADE NOTES

Homestead Valve Mfg. Co., Coraopolis, Pa., has appointed the following exclusive representatives for Homestead valves; Grinnell Co., 240 North Highland Avenue, Atlanta, Ga.; L. E. Livingston, 2012 Ward Parkway, Fort Worth, Tex., and the National Supply Co., Toledo, Ohio. The following firms have been named representatives for the company's Hypressure Jenny vapor spray cleaning machine: For the Indianapolis district, South Side Body Co., Inc., 109 West Morris Street, Indianapolis; for northern Texas, L. E. Livingston, 2012 Ward Parkway, Fort Worth; for Minnesota, North and South Dakota, William H. Ziegler Co., 2331 University Avenue, S. E. Minneapolis; for Philadelphia area, Brogan & Co., 810 Race Street, Philadelphia; for Pittsburgh and tri-state area, Beckwith Machinery Co., 6550 Hamilton Avenue, Pittsburgh; for southeastern Texas, James A. Hall, 110 Byrne Street, Houston; and for Wisconsin, Boehek Equipment Co., 2404 West Claybourn Street, Milwaukee.

Henry & Wright Mfg. Co. of Hartford, Connecticut, has acquired physical assets and good will of Henry & Wright Mfg. Co. of Massachusetts, and is manufacturing all lines of machine tools and presses previously made by Massachusetts corporation. Operations in equity receivership of old corporation are thus terminated, new corporation having taken over all orders on old company's books. Frank K. Simmons, who was president of Massachusetts corporation, has been elected president of Henry & Wright Mfg. Co. of Connecticut, and same operating personnel has been retained. H. H. Hilliard, formerly treasurer of old corporation, has been elected treasurer of the new corporation.

A REVISED and enlarged edition of its "Procedure Handbook of Arc Welding Design and Practice" has been published by the Lincoln Electric Co., Cleveland. The new volume contains more than 450 pages with several hundred illustrations. Additional material includes weld inspection (visual, stethoscopic, electro-magnetic, X-ray and Gamma-ray); study of stress distribution by means of polarized light; a simplified method for the design of arc welded machinery; procedure and speeds for arc welding aluminum; technique and speeds for welding copper; and construction of welded water lines. As pointed out in the review of the first edition in THE IRON AGE of Nov. 16, 1933, this handbook is intended for designers, engineers, and welding operators and foremen. The price postpaid in the United States is $1.50; foreign postage is 50c extra.

Collapsible Taps.—Landis Machine Co., Waynesboro, Pa. Bulletins G-81 and G-83. The first describes the new style LM receding chaser collapsible tap for standard tapered pipe threads and for longer lengths of tapered threads such as are used in high-pressure fittings and oil field equipment and tubular goods. The G-83 bulletin is devoted to the style LT collapsible tap which is for straight threads. Both taps feature a design which permits use of tap heads of various capacities on the same tap body.

Railroad Equipment

Chilean State Railways have ordered 10 locomotives of 2-8-2 type from Baldwin Locomotive Works.

Boston & Maine is inquiring for one Diesel switching locomotive, three Diesel rail motor cars and 21 suburban coaches.

Pittsburgh, Shawmut & Northern is inquiring for 150 steel hopper cars.

Alaska Railroad has ordered 10 air-dump cars from Western Wheeled Scraper Co.

Navy Department has ordered three flat cars and two box cars from Haffner-Thrall Car Co.

Milwaukee Road has ordered two air-dump cars from Western Wheeled Scraper Co.

Lehigh Valley has ordered roller bearings for five locomotives from Timken Roller Bearing Co.

RAILS

New York, Ontario & Western has placed 4500 tons of rails with Bethlehem Steel Co.

Pipe Lines

Consumers Power Co., Jackson, Mich., plans welded steel pipe line across Saginaw River for natural gas service, about 1000 ft. of 10 or 12-in.

Director of Purchases, Tennessee Valley Authority, New Sprankle Building, Knoxville, Tenn., asks bids until May 21 for two 20-ft. diameter electric machine welded plate steel penstock pipes, 1⅛ to 1⅜-in. thick, for Norris Dam, Tenn.

Glenwood Springs, Colo., closed bids May 4 for 5600 ft. of 16-in. steel plate pipe for high-pressure water service.

Lamoraie Natural Gas Co., Ltd., Hull, Que., plans welded steel pipe line, with distributing plant and other facilities. Cost over $600,000.

Municipal Gas Service Co., Dwight Building, Kansas City, Mo., will soon begin installation of steel pipe line for gas distribution at Fort Peck, Mont., for which contract recently was secured at $34,743.

Bunday Hill Natural Gas & Oil Co., Flint, Mich., care of W. E. Ross, Flint, president, recently organized with capital of $100,000, will soon begin drilling operations in Broomfield gas fields, Isabella County, and proposes steel pipe line system later.

Cast Iron Pipe

Chelmsford, Mass. has awarded 500 tons of 6, 8 and 10-in. to Warren Foundry & Pipe Corpn.

Keene, N. H., closes bids May 14 on 11,890 ft. of 10-in., 2300 ft. of 6-in. and 100 ft. of smaller class 150 pipe and 6 to 12-in. special castings.

Woonsocket, R. I., has contracted with Warren Foundry & Pipe Corpn. for its 1934 pipe requirements.

East Canton, Ohio, plans water pipe line. Fund of $57,000 is being arranged, including waterworks station.

Hope, Ind., asks bids until May 15 for water pipe line; also for elevated steel tank and tower, pumping station, etc. Fund of $56,000 has been secured through Federal aid.

Shinnston, W. Va., plans water pipe line. Funds of $48,000 is being arranged for this and waterworks station. W. S. Downs, Morgantown, W. Va., is engineer.

Miami, Fla., has awarded 7900 tons to United States Pipe & Foundry Co.

Chicago has taken bids on 483 tons of 24-in. United States Pipe & Foundry Co. is low bidder.

Ironwood, Mich., closes bids May 10 on 3780 lin. ft. of 6-in., and 1512 lin. ft. of 8-in. class C.

Dubuque, Iowa, has placed 2200 lin. ft. of 12-in. and 3000 lin. ft. of 6-in. with American Cast Iron Pipe Co.

LUMP ORE FOR OPEN HEARTHS
IRON ORE • PIG IRON • COAL
COKE ALLOYS
THE CLEVELAND-CLIFFS IRON CO., CLEVELAND O.

Eagle River, Wis., closes bids May 14 on 2432 lin. ft. 6 and 8-in., class 150, for new waterworks system.

Fox Point, Wis. (Milwaukee P. O.) plans early purchase of 1100 ft. 6-in. for water pipe extensions. C. S. Whitney is village engineer.

St. Peter, Minn., plans 6-in. pipe line for extensions in water system. L. W. Grace is city engineer.

Hibbing, Minn., plans about 8500 ft. for water pipe extensions for service on Iron Junction Road. Clark Henry is village engineer.

Inman, Kan., plans water pipe line. Fund of $26,500 has been secured, including waterworks station. F. E. Devlin, W. K. H. Building, Wichita, Kan., is consulting engineer.

Chehalis, Wash., asks bids in 30 to 60 days for about nine miles, various sizes, to replace present wooden pipe line for main water supply. Cost about $140,000. Financing is being arranged.

Board of Shawnee Township Commissioners, Wyandotte County, Kan., care of Charles A. Haskins & Co., Finance Building, Kansas City, Mo., consulting engineers, plans pipe line for water supply in Crestline Garden, Rosedale, Kanview and Turner districts. Fund of $215,000 has been secured through Federal aid.

Bureau of Reclamation, Denver, has awarded 265 tons of 8-in. to an unnamed bidder.

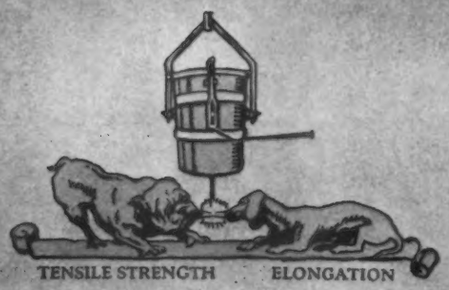
Bureau of Reclamation has placed 950 tons with United States Cast Iron Pipe Co. and 150 tons with Central Foundry Co. for a water system at Fort Peck, Mont.

Oakland, Cal., has taken bids on 933 to 1027 tons; United States Cast Iron Pipe Co. and American Cast Iron Pipe Co. are low bidders.

Seattle, has let 450 tons to United States Pipe & Foundry Co.

Mare Island, Cal., opens bids this week on 250 tons.

STRONG STEEL CASTINGS



Strong Steel Foundry Co.

Buffalo, New York

Fabricated Structural Steel

Awards Again Higher—New Projects Decline

LETTINGS of 25,800 tons are the highest since the middle of March and compare with 22,350 tons last week. Public works account for the largest tonnages, which include 5870 tons for a power plant at Boulder Dam, 4000 tons for the Hillside housing group in the Bronx, New York, and 3625 tons for a bridge across Coos Bay at North Bend, Ore. New projects of 16,310 tons compare with 27,360 tons in the previous week and 49,100 tons two weeks ago. Mill building at Struthers, Ohio, for the Youngstown Sheet & Tube Co. will require 5000 tons and tunnel ribs for the Metropolitan Water District, Los Angeles, will take 2000 tons. Sheet piling awards total 2000 tons, and 12,000 to 15,000 tons of piling will be required for the Grand Coulee Dam, on which bids will be taken in June. Plate awards total 2435 tons. Structural steel awards follow:

NORTH ATLANTIC STATES

Gilbertville, Me., 385 tons, State bridge, to Pittsburgh-Des Moines Steel Co.

Amherst, Mass., 125 tons, college dormitory, to Lehigh Structural Steel Co.

Northampton, Mass., 100 tons, two hospital units, to Bethlehem Fabricators, Inc.

New Haven, Conn., 720 tons, buildings for Yale University, to an unnamed bidder.

Middletown, Conn., 200 tons, State highway bridge, to McClintic-Marshall Corpn.

Greenwich, Conn., 460 tons, school building, to Bethlehem Fabricators, Inc.

Bronx, N. Y., 4000 tons, Hillside housing group, to American Bridge Co.

Big Flats, N. Y., 420 tons, State highway bridge, to McClintic-Marshall Corpn.

State of New York, 140 tons, highway bridge at High View Station, to McClintic-Marshall Corpn.

Newark, N. Y., 790 tons, State school, to Shippers Carline Co.

St. Lawrence and Sullivan Counties, N. Y., 255 tons, highway bridges, to McClintic-Marshall Corpn.

Coney Island, N. Y., 140 tons, Jewish nursery, to Acme Structural Steel & Iron Co.

Staten Island, N. Y., 2000 tons of sheet steel piling, dock and bulk head for Socony Vacuum Co., to a German manufacturer.

Buffalo, 240 tons, school, to McClintic-Marshall Corpn.

Wilkes-Barre, Pa., 175 tons, industrial building, to Weatherly Steel Co.

Wilkes-Barre, Pa., 170 tons, weave shed, to Weatherley Steel Co.

Aberdeen, Md., 115 tons, officers' headquarters, to Dietrich Brothers.

State of Maryland, 315 tons, 45 lookout towers, to Aermotor Co.

SOUTH AND SOUTHWEST

Morgantown, W. Va., 490 tons, University dormitories, to Pittsburgh-Des Moines Steel Co.

South Charleston, W. Va., 105 tons, shipping building for Carbide & Carbon Chemicals Corpn., to Pittsburgh Bridge & Iron Works.

Apalachicola Bay, Fla., 2680 tons, bridge, to Jones & Laughlin Steel Corpn.

Kingfisher County, Okla., 330 tons, bridge, to Missouri Valley Bridge & Iron Co.

Tarrant County, Tex., 160 tons, bridge, to North Texas Iron & Steel Co.; previously reported to Central Texas Iron Works.

State of Texas, 200 tons, highway bridge at Fort Worth, to American Bridge Co.

CENTRAL STATES

Willoughby, Ohio, 300 tons, bridge for Nickel Plate Railroad, to McClintic-Marshall Corpn.

State of Illinois, 260 tons, bridge at Dixmoor, to Illinois Steel Bridge Co.

Riverdale, Ill., 200 tons, subway, to American Bridge Co.

Donovan and Glenview, Ill., 780 tons, subways, to American Bridge Co.

Chicago, 215 tons, pent house framing, to an unnamed bidder.

Chicago, 125 tons, building, to Vierling Steel Works.

State of Iowa, 235 tons, bridge at New Albion, to Clinton Bridge Works.

State of Michigan, 150 tons, bridges at Imlay and Messick, to McClintic-Marshall Corpn.

WESTERN STATES

Boulder Dam, Nev., 5870 tons, power plant, to American Bridge Co.

Washakie County, Wyo., 395 tons, State bridge at Worland, to an unnamed bidder.

North Bend, Ore., 3625 tons, State bridge over Coos Bay, to Virginia Bridge & Iron Co.

Juneau, Alaska, 1200 tons, bridge over Gastineau Channel, to Pacific Car & Foundry Co.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

New Bedford, Mass., 200 tons, high school addition.

Pawtucket, R. I., 500 tons, municipal building.

Camden, N. J., 1400 tons, third section of Delaware River bridge; bids being taken.

Palmyra, N. Y., 1200 tons, New York Central Railroad bridge; Bates & Rogers Construction Co. low bidder for general contract.

SOUTH AND SOUTHWEST

State of Virginia, 535 tons, bridge at Danville over Dan River.

West Point, Ky., 200 tons, bridge.

Okfuskee County, Okla., 275 tons, highway bridge; bids opened May 8.

State of Oklahoma, 300 tons, bridges.

Wilton, Ark., 350 tons, bridge.

CENTRAL STATES

Struthers, Ohio, 5000 tons, strip mill group buildings for Youngstown Sheet & Tube Co.

Toledo, Ohio, 700 tons, Y. M. C. A. building.

Toledo, 140 tons, sheet steel piling.

Fairport, Ohio, 1000 tons, sheet steel piling for breakwater development.

State of Indiana, 600 tons, bridges; bids to be taken may 22.

State of Illinois, 600 tons, bridges; bids to be taken May 22.

State of Missouri, 375 tons, bridges.

Independence, Mo., 225 tons, bridge.

State of Iowa, 350 tons, bridges.

Western States

Denver, 200 tons, bridge.

Adams County, Colo., 200 tons, State highway bridge; bids May 10.

Los Angeles, 2000 tons, tunnel ribs for Metropolitan Water District, Specification M-2025; bids under advisement.

Snohomish County, Wash., 125 tons, State bridge; bids May 15.

Grand Coulee Dam, Almira, Wash., 12,000 to 15,000 tons of sheet steel piling; bids to be received in June.

Reedsport, Ore., 750 tons, bridge.

FABRICATED PLATE

AWARDS

Holyoke, Mass., 1400 tons, municipal gas holder, to Bartlett Hayward Co.

East Providence, R. I., 425 tons, plate for pipe line, to Walsh's Holyoke Steam Boiler Works.

HY-TEN S.A.E. STEELS

2315, 4615, 3140, 5150, 6145, 4150

are available for immediate stock shipment

WHEELOCK, LOVEJOY & COMPANY, INC.

CAMBRIDGE CHICAGO CLEVELAND DETROIT

Memphis, Tenn., 110 tons, suction and discharge pipe for United States Engineer Office, to Ellicott Machine Co., Baltimore.

St. Louis, Mo., 500 tons, pontoons, to Saint Louis Car Co.

NEW PROJECTS

Louisville, Ky., 750 tons, pontoons for United States Engineer Office.

Sacramento, Cal., 250 or 500 tons, 21 or 42 pontoons for United States Engineers; Pacific Coast Engineering Co. low bidder.

Steel Price Changes

AMONG new minimum base prices filed with the American Iron and Steel Institute are the following:

Product and Effective Date	Base Price, Ton	Basing Point
Alloy ingots, uncropped, May 3	$42	Chicago
Single loop bale ties, May 4	63	Cleveland
Ingots, uncropped re-rolling quality, carbon steel, May 4	29 100 Lb.	Pittsburgh
Bessemer or basic mfrs. wire, May 7	$2.75	Pacific Coast Ports
Bessemer or basic mfrs. wire, May 7	2.78	Houston and Galveston, Tex.
An'led fence wire, May 7	2.85	New Orleans, La.
An'led fence wire, May 7	2.75	Houston and Galveston, Tex.
An'led fence wire, May 7	3.00	Pacific Coast Ports
Galv. fence wire, May 7	3.20	New Orleans
Galv. fence wire, May 7	3.10	Houston and Galveston, Tex.
Galv. fence wire, May 7	3.35	Pacific Coast Ports
An'led stone wire, May 7	4.30	Pittsburgh
An'led stone wire, May 7	4.95	Pacific Coast Ports
Galv. stone wire, May 7	5.30	Pittsburgh
Galv. stone wire, May 7	5.95	Pacific Coast Ports
Weaving wire (not for fly screen cloth), May 7	3.90	Pittsburgh
Tag wire, May 7	3.90	Pittsburgh
Wire nails, May 7	2.90	Houston and Galveston, Tex.
Polished fence staples, May 7	3.60	Houston and Galveston, Tex.
Galv. fence staples, May 7	3.85	Houston and Galveston, Tex.
Galv. netting staples, May 7	5.00	Houston and Galveston, Tex.
Barbed wire, May 7	3.30	Houston and Galveston, Tex.
Low-carbon spring wire, May 11	2.30 Ton	Cleveland
Poultry fence, Spec. No. 17, May 11	$121 100 Lb.	
Electric furnace plain carbon steel, hot rolled, general requirement grade, but not including tool steel grade. Carbon up to 0.50 inc., May 11. Alloy quality bar base	$3.05 Gross Ton	Canton, Ohio
Alloy quality billet base	$61 100 Lb.	Canton, Ohio
Carbon 0.51 to 0.80 inc., May 11. Alloy quality bar base	$3.30 Gross Ton	Canton, Ohio
Alloy quality billet base	$66 100 Lb.	Canton, Ohio
Carbon 0.81 to 1.05 inc., May 11. Alloy quality bar base	$3.55 Gross Ton	Canton, Ohio
Alloy quality billet base	$71 100 Lb.	Canton, Ohio
Electric furnace SAE 1095 spring steel rounds, May 11. Alloy quality bar base	$3.05 Ton	Canton, Ohio
Special analysis die block steel, May 11	$51 100 Lb.	Canton, Ohio
Steel sheet piling, May 13	$2.00	Pittsburgh
Steel sheet piling, May 13	2.10 Lb.	Buffalo
Stainless Type No. 304, May 15.		Pittsburgh
Analysis: Carbon, 0.11 max. Chrome, 17 to 19 Nickel, 7 to 9		
Hot-rolled strip	23c.	
Cold-rolled strip	30c.	
Slabs	16¼c.	
Stainless Type No. 305, May 15.		Pittsburgh
Analysis: Carbon, Over 0.08 to 0.20 Chrome, 18 to 20 Nickel, 8 to 10		
Hot-rolled strip	23c.	
Cold-rolled strip	30c.	
Slabs	16¼c.	
Stainless Type No. 306, May 15.		Pittsburgh
Analysis: Carbon, 0.11 max. Chrome, 18 to 20 Nickel, 8 to 10		
Hot-rolled strip	25c.	
Cold-rolled strip	32c.	
Slabs	17¼c.	
Stainless Type No. 307, May 15.		Pittsburgh
Analysis: Carbon, Over 0.08 to 0.20 Chrome, 19 to 22 Nickel, 9 to 12		
Hot-rolled strip	25c.	
Cold-rolled strip	32c.	
Slabs	17¼c.	
Stainless Type No. 308, May 15.		Pittsburgh
Analysis: Carbon, 0.11 max. Chrome, 19 to 22 Nickel, 9 to 12		
Hot-rolled strip	27c.	
Cold-rolled strip	34c.	
Slabs	18¼c.	
Stainless Type No. 320, May 15.		Pittsburgh
Analysis: Carbon, 0.20 max. Chrome, 17 to 19 Nickel 7 to 9 Titanium, equal four times carbon content		
Bars	25c.	
Plates	30c.	
Sheets	37c.	
Hot-rolled strip	25½c.	
Cold-rolled strip	34c.	
Slabs	19c.	
Angles	25c.	
Stainless Type No. 321, May 15.		Pittsburgh
Analysis: Carbon, 0.20 max. Chrome, 18 to 20 Nickel, 8 to 10 Titanium, equal four times carbon content		
Bars	27c.	
Plates	32c.	
Sheets	39c.	
Hot-rolled strip	27½c.	
Cold-rolled strip	36c.	
Slabs	21c.	
Angles	27c.	
Stainless Type No. 411, May 17.		Pittsburgh
Analysis: Carbon, 0.12 max. Chrome, 12 to 15 Silicon, 1.00 Copper, 1.00		
Hot-rolled strip	15c.	
Cold-rolled strip	20½c.	
Slabs	10½c.	
Stainless Type No. 434, May 17.		Pittsburgh
Analysis: Carbon, 0.12 max. Chrome, 15 to 18 Silicon, 1.00 Copper, 1.00		
Hot-rolled strip	16c.	
Cold-rolled strip	22c.	
Slabs	11¼c.	
Electrical sheets, electrical disposal grade, April 23	3c.	Pittsburgh

PLANT EXPANSION AND EQUIPMENT BUYING

Moderate Improvement in Number of Small Orders for Machine Tools

SMALL orders for machine tools are increasing in number, reflecting a growing diversification of demand, but total business has not gained sufficiently to warrant a speeding up of production. Automobile manufacturers have placed a few small standard tools, but the bulk of business is coming from miscellaneous sources, among them buyers in Japan, Italy and South Africa.

Bookings at the beginning of May are in about the same volume as a month ago. Prior to April 1 there was a steady upward trend in orders, but since that time strikes and threatened strikes have acted as a brake on buying.

NEW ENGLAND

New Haven Pulp & Board Co., Railroad Avenue, New Haven, Conn., has let general contract to H. Wales Lines Co., Meriden, Conn., for three-story and basement addition, 60 x 100 ft. Cost about $60,000 with equipment. Frederick L. Smith, 21 East Fortieth Street, New York, is engineer.

Skild-Craft Machine Co., Inc., Brockton, Mass., has been organized by Ashton Hamilton, 279 Prospect Street, and associates, to manufacture machinery and parts.

J. Dervan, Newton, Mass., has leased former factory of Shepherd Worsted Mill, 80 Bridge Street, Nonantum district, and will remodel for manufacture of brass and copper tubing. Mr. Dervan was formerly connected with American Tube Works, Somerville, Mass.

State National Guard, Capitol Building, Hartford, Conn., Col. Bissell, in charge, plans machine shop in State Armory, East Lyme, Conn., in connection with extensions and improvements. Cost about $100,000. Payne & Keefe, 231 State Street, New London, Conn., are architects.

NORTH ATLANTIC

American Consolidated Tin Mines Corpn., 120 Liberty Street, New York, will take bids soon for new tin ore milling plant near Lincolnton, N. C., with power house, machine shop and other mechanical departments. Mining, hoisting and conveying machinery will also be installed. Cost over $150,000 with equipment. U. S. James, 35 Runyon Street, Newark, N. J., is metallurgical engineer.

Rubel Corpn., 937 Fulton Street, Brooklyn, operating refrigerating and cold storage plants, etc., has plans for new bulk oil storage and distributing plant at India Wharf and Conover Street. Cost over $100,000 with tanks and equipment. A. H. Eccles, 1 Bridge Plaza, Long Island City, is architect.

Caldo Engineering Co., Inc., Brooklyn, has been organized by Gustave Zimmermann, 107 110th Street, Richmond Hill, L. I., and associates, to manufacture oil burners and oil-burning equipment.

Superintendent of Lighthouses, St. George, Staten Island, N. Y., asks bids until May 15 for one engine-driven generating set (Proposal 46151); until May 28, eight signal controllers, one composite signal control, eight electric radio-beacon synchronizers, 12 signal timers, etc. (Proposal 46104).

Standard Oil Co. of New York, 26 Broadway, New York, plans new bulk oil storage and distribution plant at Torrington, Conn. Project will include motor-truck service, repair and garage unit for company trucks. Cost about $45,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until May 15 for 28 electric drills (Schedule 2405), breast and hand-drills and ratchet braces (Schedule 2398), 75 chain hoists (Schedule 2403), stamping figures and letters (Schedule 2404), 650 electric soldering irons (Schedule 2402), rules and tapes (Schedule 2397), vises (Schedule 2427), wrenches (Schedule 2433), sharpening stones (Schedule 2407) for Brooklyn and Sewall's Point Navy yards; 96 oxy-acetylene welding torches, and 100 hand-cutting oxy-acetylene torches (Schedule 2406) for Brooklyn yard.

Consolidated Coppermines Corpn., 120 Broadway, New York, plans reduction, milling and smelting plant at copper mining properties at Kimberly, near Ely, Utah, including new power system and water pipe line. Copper mines will also be extended and additional mining machinery installed. Entire program will cost close to $5,500,000, and financing is under way for gross sum of $7,000,000, remainder to be used for working capital. J. B. Kaffner is general manager.

Signal Supply Officer, Army Base, Brooklyn, asks bids until May 18 for 51,000 ft. telephone cable and 10 reels (Circular 101).

Board of Education, Lake Placid, N. Y., plans manual training department in new multi-story school for which fund of $300,000 has been secured through Federal aid. H. C. Fullerton, 111 State Street, Albany, N. Y., is architect.

Utility Tube Co., 146 Coit Street, Irvington, N. J., manufacturer of flexible steel conduits, lead cable, etc., has leased larger part of two-story building at 153 Frelinghuysen Avenue, Newark, for new plant, expanding present capacity. Louis I. Braunstein is president.

Atlantic Refining Co., 260 South Broad Street, Philadelphia, has plans for new bulk oil storage and distributing plant at Rochester, N. Y., including battery of steel tanks, pumping station, motor truck service, repair and garage unit. Cost over $150,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until May 15 for six portable scales, two of 1000-lb. capacity, two 500-lb., and two 250-lb. capacity (Schedule 2458-R) for Philadelphia Navy Yard.

Harry A. Robinson, Morris Building, Philadelphia, machinery and parts, has purchased 12 buildings formerly used by Cramp Brass & Iron Foundries Co., totaling about 100,000 sq. ft. floor space, and will occupy in part for new works.

BUFFALO DISTRICT

American Treibach Chemical Works, Inc., Niagara Falls, N. Y., recently organized as an American affiliation of Treibacher Chemische Werke, Treibach, Austria, has leased building at 3303 Highland Avenue for production of metallic cerium and allied products. Initial works will cost over $100,000 with equipment. Company has also taken options on adjoining land and plans erection of new plant unit later, to cost over $150,000 with machinery. Charles Ganz is president of new organization. Edward R. Cole is consulting engineer.

Artcraft Platers, Inc., Buffalo, has been organized by Harold M. Goldstein, 499 Richmond Avenue, and associates, to operate an electro-plating and metal polishing works.

City Council, Lockport, N. Y., plans new municipal incinerator plant. Cost $60,000 with furnace equipment, conveying and unloading machinery, etc. Financing is being arranged.

OHIO AND INDIANA

S.A.E. Steel Co., 1408 East Forty-seventh Street, Cleveland, iron and steel products, has awarded general contract to William Dunbar Co., 8201 Cedar Street, for one-story storage and distribution unit, 40 x 100 ft.

Flexible Axle Co., Cleveland, recently organized, as noted in these columns, has arranged with Columbia Axle Co., 850 East Fifty-second Street, for initial production of new automobile axles and spring devices. E. J. Baker, Jr., Chicago, head of Baker Axle Co., is president of new company, and Ira W. Jones, Builders' Exchange Building, Cleveland, secretary and treasurer.

Dayton Rubber Mfg. Co., 2345 Riverview Avenue, Dayton, Ohio, manufacturer of automobile tires, etc., has plans for extensions in power plant and installation of new generator unit, boilers and other equipment; cost about $70,000. Company will also carry out mill expansion and improvements to cost close to $55,000 with equipment. Geyer & Neuffer, Arcade Building, are architects and engineers.

Hamlin Metal Products Co., Akron, Ohio, has been organized by Earl E. Hamlin and James A. Loftus, care of Schwab & Peters, First Central Trust Building, representatives, to manufacture metal goods.

ARE YOUR MATERIALS HANDLING METHODS

an Asset or a Liability?

•

Savings in manufacturing costs, overhead costs and general costs are made possible by Osborn Tramrail Systems.

Whatever the load...there's a correct Osborn Grab to pick it up. Wherever the load must be moved...there's a correct combination of Osborn Tramrail Units to carry the load, via the overhead route, with speed, safety and economy.

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Transmit ALL the Power Always at the SAME SPEED

Reduction of the power loss on every drive—proved by reduced power bills—is one reason for the unusual increase in the use of Diamond Roller Chains (always 98-99% efficient) during the past 15 years.

Whether you have a few or many drives in your plant—the need for immediate reduction of power transmission losses is apparent because of its bearing on production costs and profits.

A further and perhaps even more important saving in production costs results from the driven shaft turning continuously and exactly at the speed you plan for the maximum machine output. The speed ratio and therefore the rate of production will remain at the desired maximum regardless of time.

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DIAMOND CHAIN & MFG. CO., 433 Kentucky Ave., Indianapolis, Ind.

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DIAMOND CHAIN

ROLLING ~ AT POINTS OF CONTACT

Contracting Officer, Materiel Division, Wright Field, Dayton, Ohio, asks bids until May 14 for two air baffles and engine cowling (Circular 524); until May 15, 100 cradle assemblies (Circular 529).

Shepherd Chemical Co., Highland Avenue, Norwood, Cincinnati, manufacturer of industrial chemicals, etc., has plans for one-story addition, 50 x 100 ft. Cost about $25,000 with equipment. Improvements will also be made in power house.

American Can Co., South East Street and Belt Railroad, Indianapolis, with headquarters at New York, has leased one-story building in Marmon Industrial Center, totaling 40,000 sq. ft. space, for new factory branch, storage and distributing plant.

Stark Mfg. Co., Inc., Rushville, Ind., has been organized by John and James Stark, Rushville, to manufacture electrical equipment and appliances.

SOUTHWEST

M. K. Goetz Brewing Co., Sixth and Albemarle Streets, St. Joseph, Mo., will take bids at once on general contract for new multistory plant on site recently acquired at Kansas City, Mo., with boiler house, machine shop and other units. Cost $450,000 with machinery. George L. Lehle, 111 West Washington Street, Chicago, is architect and engineer.

Board of Trustees, University of Arkansas, Fayetteville, Ark., L. L. Browne, superintendent of buildings and grounds, asks bids until May 16 for extensions in steam power plant and equipment, pipe lines, steam piping, electrical distribution system, etc.

City Council, Mount Vernon, Mo., plans early call for bids for addition to municipal electric light and power plant, including Diesel engine-generating unit and accessories. Shockley Engineering Co., Graphic Arts Building, Kansas City, Mo., is consulting engineer.

Board of Education, Blackwell, Okla., plans manual training department in new two-story and basement high school. Fund of $220,000 has been secured through Federal aid. Leland I. Shumway, Alexander Building, Tulsa, Okla., is architect.

Dallas Brewery, Inc., Dallas, Tex., recently organized by Charles F. Kruse, Dallas, and associates, has taken over former Lemp brewing plant, Dundee and Pacific Streets, and will remodel for new brewery, and install brewhouse, bottling, conveying and other equipment. Cost about $50,000 with machinery.

City Council, Bridgeport, Tex., asks bids until May 15 for pumping machinery and accessories, 125,000-gal. capacity elevated steel tank and tower, pipe lines, fittings, etc., for municipal waterworks and sewer system. Fund of $145,000 has been secured through Federal aid. Hawley, Freese & Nichols, Capps Building, Fort Worth, Tex., are consulting engineers.

WESTERN PENNA.

Pennsylvania Metal Products Co., Oil City, Pa., has acquired plant of J. C. Black Mfg. Co., manufacturer of radiators, parts, etc., and will convert for manufacture of tacks, nails and allied products.

Board of Education, Farrell, Pa., plans vocational training shops and science laboratories in new three-story and basement high school. Cost over $300,000. Federal financing is being arranged. Clepper & Clepper, Sharon, Pa., are architects.

Common Council, Elizabeth, W. Va., plans installation of pumping machinery and auxiliary equipment, pipe lines, etc., for municipal water system. Fund of $70,000 is being secured. Bernard G. Sampson Co., Fairmont, W. Va., is consulting engineer.

Board of County Commissioners, County Office Building, Pittsburgh, asks bids until May 15 for sheet metal enameled bridge signs, load-limit signs and metal sign posts, with accessories.

Crew-Levick Co., Elverson Building, Philadelphia, plans extensions and improvements in oil refinery at Titusville, Pa., including equipment. Cost over $200,000 with machinery.

MIDDLE WEST

Board of Trustees, State School for Boys, St. Charles, Ill., has plans for new steam power house for central heating. Cost about $25,000 with equipment. Division of Architecture and Engineering, Capitol Building, Springfield, Ill., is engineer.

Arcady Farms Milling Co., 223 West Jackson Boulevard, Chicago, plans rebuilding part of grain and feed elevator recently destroyed by fire. Loss over $100,000 with elevating, conveying and other equipment.

Stoker Products, Inc., 225 West Prairie Street, Decatur, Ill., has been organized by William H. Klett and Joseph G. Beard, to manufacture mechanical stokers, parts, etc.

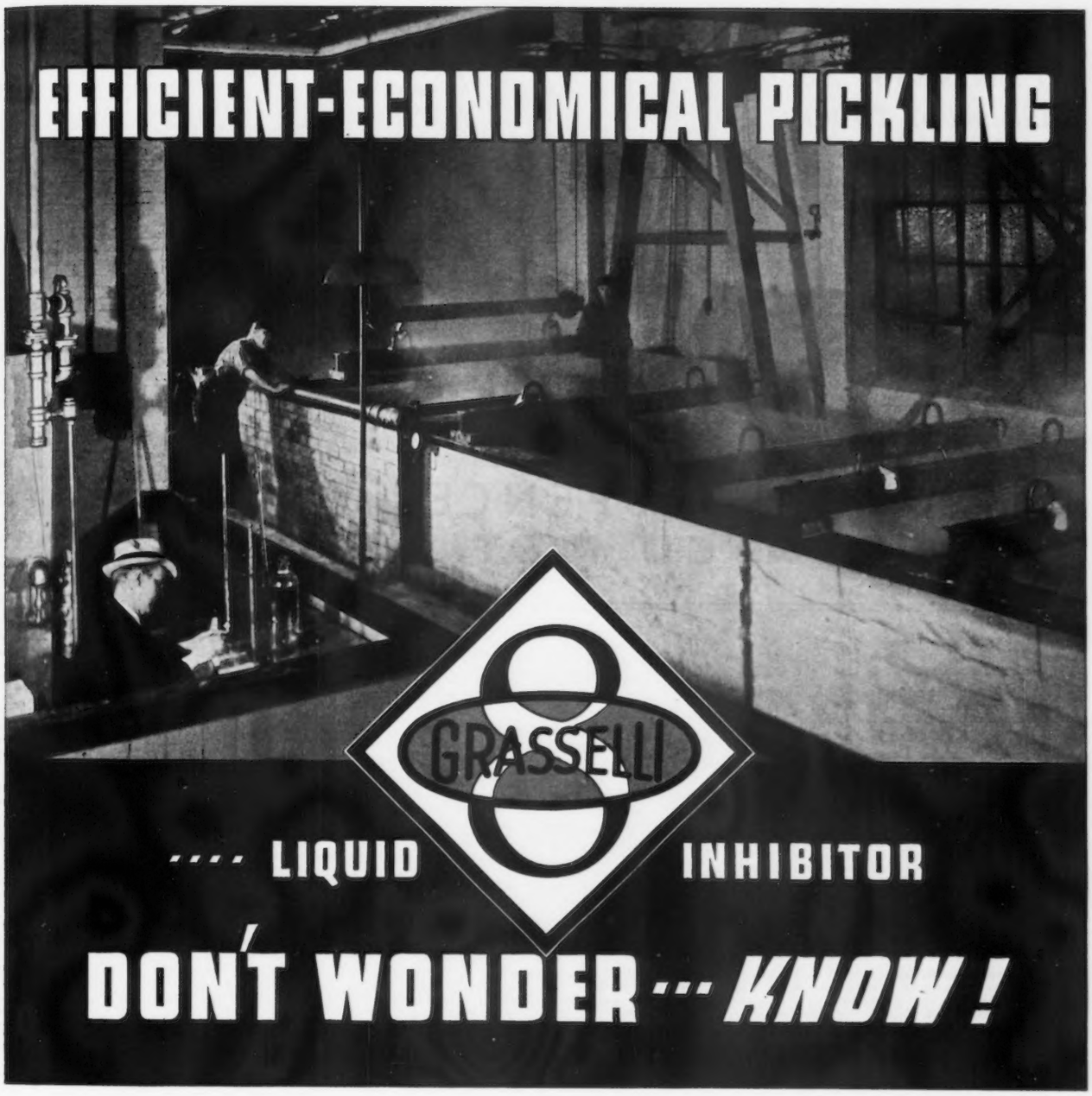
Town Council, Guttenberg, Iowa, asks bids until May 21 for equipment for new municipal electric light and power plant, including two Diesel engine-generator units and accessories, two exciters, fuel unloading and storage system, pumping equipment, atmospheric cooling tower, switchboard, instruments, etc., for which fund of $70,000 has been arranged. E. Van Fleet, 791 Nevada Street, Dubuque, Iowa, is consulting engineer.

Spencer Kellogg & Sons, Inc., Flour Exchange Building, Minneapolis, linseed oil products, has let general contract to Barnett & Record, Flour Exchange Building, for addition to grain elevator at Superior, Wis. Cost about $200,000 with storage tanks, conveyors, elevating equipment, sorting and weighing machinery, etc. Headquarters are at Niagara Square, Buffalo.

United States Engineer Office, Milwaukee, asks bids until May 23 for one steel frame combination electric and hand power hoist for operating taintor sluice gates (Circular 232).

City Council, Valley City, N. D., asks bids until May 21 for equipment for municipal power plant, including boiler, superheater, stokers, forced and induced draft fans, automatic combustion control equipment, meters, instruments, etc. O. N. Bergman is superintendent of Electric Light, Heat and Waterworks Department.

Great Falls Iron Works, Inc., Great Falls, Mont., has been organized by R. H. Barclay and A. A. Pinski, 1416 Seventh Avenue North,



ARE you able to say that your pickling room is operating efficiently ...that your acid consumption and overall costs are at a minimum?

If not, consider the use of Grasselli 8 Liquid Inhibitor and in connection with its use, Grasselli Steel Service.

Each represents a valuable aid to your pickling operations. The cost of Grasselli 8 Liquid Inhibitor averages from 1c to 2c per ton of material pickled. THERE IS NO COST for the use of Grasselli Steel Service.

GRASSELLI STEEL SERVICE

Not a name but a complete all-around laboratory and plant pickling service ... maintained for the purpose of servicing our products and your problems. We ask you to make use of it.

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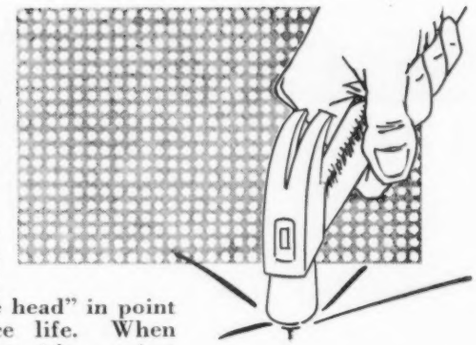
GRASSELLI...THE ANSWER TO YOUR PICKLING PROBLEM

IT TAKES KNOWLEDGE AND STUDY TO DO IT



The proper metal, right thickness and efficient pattern are essentials if perforated metal is going to "hit the nail on the head" in point of maximum, efficient service life. When Perforated Metal is satisfactory, it's not just happenstance. Wickwire Spencer Engineers will study your application and, because they know their subject, the product will give you satisfaction at minimum cost based upon length of service. Consult these men. It will cost you nothing and may save you money and trouble.

Wickwire Spencer Steel Company, 41 East 42nd Street, New York City; Buffalo, Chicago, Detroit, Philadelphia, Tulsa, Worcester; Pacific Coast Headquarters: San Francisco; Warehouses: Los Angeles, Seattle, Portland. Export Sales Department: New York City.

WICKWIRE SPENCER PERFORATED METALS

and associates, to operate a general iron works and foundry.

A. Winther Machine Co., 1915 Thirty-fifth Street, Kenosha, Wis., has broken ground for new machine shop, 50 x 120 ft. Cost complete will be about $20,000.

Wesbar Stamping Corpn., Barton, Wis., has been incorporated by W. M. Urkart, Oscar Schlegel and C. I. Nielson, of West Bend, Wis., to establish shop in existing building for manufacture of tools, dies, jigs, fixtures, gages, and metal stampings on jobbing basis.

Northern Conveyor & Mfg. Co., Janesville, Wis., has been acquired by Edgar Leach, general manager for two years under receivership, who is reorganizing business, improving shop and equipment and adding new designs.

SOUTH ATLANTIC

Greenville Textile Machinery Co., Greenville, S. C., has let general contract to R. S. Sizemore, Greenville, for extensions and improvements. Cost about $18,000 with equipment.

Rourke's Iron Works, Inc., Savannah, Ga., has been organized by Arthur L. and James A. Rourke, Jr., 545 East Bay Avenue, to operate a general iron and metal-working plant.

Board of Glynn County Commissioners, Brunswick, Ga., plans municipal airport on St. Simons Island, with hangar, repair shop and other facilities. Fund of $90,000 is being arranged through Federal aid. A boat repair and reconditioning shop is planned at new boat storage plant on Frederica River. Cost about $30,000 with equipment. Federal financing has been arranged.

Gastonia Brush, Roller, Flyer & Spindle Co., Gastonia, N. C., manufacturer of textile mill equipment and parts, plans expansion and improvements, including larger machine shop facilities.

SOUTH CENTRAL

United States Engineer Office, Memphis, Tenn., asks bids until May 14 for one engine lathe, shaper, and radial drill, all motor driven, emery grinder and grindstone (Circular 385), one externally fired return flue boiler (Circular 386).

New England Distilling Co., 115 Pike Street, Covington, Ky., has plans for one-story building for storage and distribution. Cost about $25,000 with equipment. Abner E. Foster, City Hall, is architect.

Memphis Power & Light Co., Memphis, Tenn., plans power transmission line along Jefferson Davis Highway to Millington and vicinity, about 15 miles, and will also make extensions and improvements in underground power lines in first noted city. Cost over $60,000.

James E. Pepper Distillery, Lexington, Ky., plans rebuilding part of plant recently destroyed by fire. Loss over $250,000 with equipment. Company is erecting new distillery unit to cost about $400,000 with machinery. It is a subsidiary of Schenley Distillers Corpn., 20 West Fortieth Street, New York.

United States Engineer Office, First District, New Orleans, asks bids until May 14 for safety switches, line starter, four portable testing shunts, washers, transformer, voltmeter, etc. (Circular 333).

WASHINGTON DISTRICT

Board of District Commissioners, District Building, Washington, asks bids until May 17 for automobile and motorcycle hinged dies, auto rimming dies, sub-press blanking die for embossing auto identification plates; until May 21 for 3000 water meters.

Hunter, Gwynnbrook Distilling Corpn., Owings Mills, Md., recently organized, has acquired local Gwynnbrook distillery. Improvements will be made and new blending plant established at Baltimore. Talbot O. Freeman is vice-president in charge of operations.

Bureau of Yards and Docks, Navy Department, Washington, asks bids until May 16 for oil storage tank and piping at Naval Academy, Annapolis, Md. (Specification 7661).

Purchasing and Contracting Officer, Holabird Quartermaster Depot, Baltimore, asks bids until May 14 for one brake jack, brake band relining and riveting machine, wheel puller and gear, grease gun, valve resurfacer, scraper and other tools (Circular 136).

General Purchasing Officer, Panama Canal, Washington, asks bids until May 16 for one buffing and polishing lathe, steel and brass bolts, carriage bolts, machine bolts and nuts, iron and steel washers, 5000 lb. steel shot, pipe fittings, etc. (Schedule 2958).

MICHIGAN DISTRICT

Allied Paper Mills, Inc., Kalamazoo, Mich., plans extensions and improvements in King division mill, with new equipment to double present capacity. Cost about $200,000 with machinery.

Lansing Brewing Co., Lansing, Mich., has rejected bids recently received for new plant unit, and will ask bids soon on revised plans. Cost about $100,000 with equipment. Mildner & Eisen, Hammond Building, Detroit, are architects.

Superintendent of Lighthouses, Detroit, asks bids until May 22 for four to eight fabricated steel towers for breakwater light stations.

Universal Water Purifier, Inc., 2626 East Genesee Avenue, Saginaw, Mich., has been organized by A. E. Williams, 2146 Gratiot Avenue, and associates, to manufacture instruments and equipment for water purification and filtering.

State Administrative Board, Lansing, Mich., plans new power house at State Training School for Girls, Adrian, Mich. Cost about $70,000 with equipment.

Monroe Brewing Co., Monroe, Mich., plans new two and four-story plant, 95 x 270 ft. Cost over $100,000 with equipment. L. M. Schnagel, Monroe, is architect.

PACIFIC COAST

Board of Education, Long Beach, Cal., has authorized plans for new vocational training shop and equipment storage and distributing building. Cost about $70,000 with tools and equipment. William K. Webb, 1235 East Tenth Street, is architect.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until May 18 for seven airplane flotation gear bags (Schedule 2410-R) for San Diego Navy Yard; two motor-driven turret lathes (Schedule 2416), two centrifugal ventilating sets and spare parts (Schedule 2385) for Puget Sound yard.

East Side Winery, Lodi, Cal., E. J. Mettler, head, plans new works on 10-acre tract recently acquired with power house, machine shop and other structures. Cost about $125,000 with equipment.

Construction Service, Veterans' Administration, Washington, asks bids until May 29 for steel water tank for institution at Los Angeles; also bids for incinerator plant, same location.

Independent Ice & Cold Storage Co., 511 Middle Waterway, Tacoma, Wash., has plans for new multi-story brewing plant in McKinley Hill district, with boiler house, machine shop and other units. Cost over $100,000 with machinery. Richard Ullrich, Smith Tower Annex, Seattle, is consulting engineer.

City Light and Power Department, Seattle, is disposing of bond issue of $5,000,000, proceeds to be used in connection with municipal hydroelectric power development on Skagit River, forming concluding units of project, with transmission lines, substations, switching stations and other structures. Total fund of $13,000,000 has been secured through Federal aid. J. D. Ross is superintendent of department.

Automotive Safety Devices, Inc., Los Angeles, has been organized by W. J. MacLellan and J. A. Wade, care of Mathes & Sheppard, 458 South Spring Street, representatives, to manufacture special automobile devices and equipment.

FOREIGN

Victoria Falls & Transvaal Power Co., Johannesburg, South Africa, plans new hydroelectric generating plant at Meyerton, Transvaal district, to be known as Klip generating station. Project will include substations and switching stations, with new transmission lines to Rand gold-mining district, about 30 miles distance, and to Nigel territory, as well as points in Orange Free State. Entire project will cost about $5,000,000.

Metal Trust, Soviet Russian Government, Moscow, plans addition to Kuznetz steel works, Kuznetz, Siberia, on site a few miles distant on Tom River, to manufacture rails, shells and other heavy steel products. Cost over $3,000,000 with machinery. Amtorg Trading Corpn., 261 Fifth Avenue, New York, is official buying agency.

Indian Railway Administration, Delhi, India, has authorized fund of $30,000,000 for extensions and improvements, of which about $17,000,000 will be expended for track renewals and new lines, and remainder for rolling stock, shop facilities, tools and equipment. Program will be carried out this year.

Consolidated Products Co., Inc., New York, has made alterations and extensions to suite 15-18 Park Row, adding private offices and enlarging executive and clerical space.

1. WHAT MANUFACTURER of Materials-Handling Trucks, Tractors, Cranes, and related equipment, began in 1930 to increase its Engineering Staff, and built up until in 1933 its Engineering Department (always *big enough*) was largest in Company's history?

2. WHAT MANUFACTURER has, as the result of this sound and deep Engineering work, produced a line so well-developed and constantly being improved that it is literally *all new*—even though the maker has been in the truck business for more than 25 years?

3. WHAT MANUFACTURER builds power industrial trucks exclusively, on a large scale?

4. WHAT MANUFACTURER now makes the most models; the most types of a particular model; and in the highest-rated capacities?

5. WHAT MANUFACTURER, after a business lifetime as the Industry's producer of Electrics, takes the lead in developing Gas and Gas-Electric Trucks?

6. WHAT MANUFACTURER now has completely-tested, proved, *new* types in all three—not in pictures, but sold and at work?

7. WHAT MANUFACTURER has developed attachments which adapt his machines to almost every industrial demand: picking up, elevating, carrying, tiering, charging; or can build on specification to meet the most unusual requirements?

8. WHAT MANUFACTURER believes that one of the greatest single methods of saving money in materials handling is by handling loads on pallets; and

9. WHAT MANUFACTURER has developed so complete a line of Trucks with Telescoping Uprights for pallet-handling; capable of carrying loads under speed for any distance; "ducking" low doorways yet reaching for the roof in warehouses; pulling powerfully up-grade yet traveling down under full control?

10. WHAT MANUFACTURER regards his clients' present material-handling problems as *new* problems, originating in 1934—and sets out to meet them in the most modern, *saving* ways?

11. WHAT MANUFACTURER'S service records show that costs for repair parts for the machines he sold from 1 to 20 years ago, average only $6.00 per month per machine?

12. WHAT MANUFACTURER knows that, from all available records, at least 95% of all the machines he has sold during 28 years are still in service?

13. LUCKY QUESTION! What manufacturer is keeping his identity no secret, nor witholds any facts about the ability of his product to do big, useful, money-saving jobs in every industry where materials have to be picked up, carried, put down again safely, quickly, and in volume?

Answers to *all* these questions will give you more appreciation of the high standards to which new Elwell-Parker Trucks are being built, and what they are doing in industry.

For information about what "Elwell-Parkers" will do in your work, just describe your own handling job in enough detail to give our Engineers the general idea, and address The Elwell-Parker Electric Company, 4323 St. Clair Avenue, Cleveland, Ohio.

New ELWELL·PARKER *trucks*

Exports and Imports in Sharp Rise in March

Exports of Iron and Steel from the United States

(In Gross Tons)

	March		Three Months Ended March	
	1934	1933	1934	1933
Pig iron	186	105	838	668
Ferromanganese	2	....	8	....
Scrap	173,165	57,522	336,321	127,466
Pig iron, ferroalloys and scrap	*173,353*	*57,627*	*337,167*	*128,134*
Ingots, blooms, billets, sheet bar	766	154	1,900	249
Skelp	2,249	83	3,885	478
Wire rods	1,180	148	9,381	2,894
Semi-finished steel	*4,195*	*385*	*15,166*	*3,621*
Steel bars	3,121	1,223	9,785	3,698
Alloy steel bars	347	165	898	240
Iron bars	25	49	195	93
Plates, iron and steel	1,935	195	7,426	1,077
Sheets, galvanized steel	7,738	2,563	16,817	6,554
Sheets, galvanized iron	213	33	401	102
Sheets, black steel	7,194	2,277	17,854	6,795
Sheets, black iron	349	125	648	402
Hoops, bands, strip steel	3,038	1,276	7,823	3,652
Tin plate, terne plate	27,264	3,394	64,894	10,732
Structural shapes, plain material	1,278	472	3,926	1,609
Structural material, fabricated	1,573	1,192	5,121	2,372
Tanks, steel	758	113	2,886	616
Steel rails	3,752	104	27,130	3,183
Rail fastenings, switches, frogs, etc	1,770	85	8,317	626
Boiler tubes	371	273	1,423	1,121
Casing and oil line pipe	5,478	1,433	14,994	6,074
Pipe, black and galvanized, welded steel	5,041	1,930	11,470	5,083
Pipe, black and galvanized, welded iron	100	169	467	287
Plain wire	2,842	571	9,734	1,461
Barbed wire and woven wire fencing	3,233	1,691	8,892	4,358
Wire cloth and screening	62	73	157	141
Wire rope	220	233	624	424
Wire nails	1,300	482	3,132	1,562
Other nails and tacks	551	247	1,234	854
Horseshoes	6	1	29	7
Bolts, nuts, rivets and washers, except track	295	312	1,117	738
Rolled and finished steel	*79,854*	*20,681*	*227,394*	*63,861*
Cast iron pipe and fittings	1,563	519	4,046	1,348
Malleable iron screwed fittings	222	235	795	451
Car wheels and axles	306	250	1,003	1,456
Iron castings	907	317	2,334	716
Steel castings	61	100	215	195
Forgings	342	249	861	676
Castings and forgings	*3,401*	*1,670*	*9,254*	*4,842*
All other	466	204	1,495	714
Total	261,269	80,567	590,476	201,172

Imports of Iron and Steel Products into the United States

(In Gross Tons)

	March		Three Months Ended March	
	1934	1933	1934	1933
Pig iron	20,674	9,314	43,337	24,140
Sponge iron	121	....	194	53
Ferromanganese and spiegeleisen*	3,061	2,071	7,203	6,202
Ferrochrome†	2	5	20	5
Ferrosilicon‡	28	....	91	4
Other ferroalloys	....	....	....	1
Scrap	6,056	491	11,559	941
Pig iron, ferroalloys and scrap	*29,942*	*11,881*	*62,404*	*31,346*
Steel ingots, blooms, etc	179	15	300	71
Wire rods	1,300	1,017	2,911	3,131
Semi-finished steel	*1,479*	*1,032*	*3,211*	*3,202*
Concrete reinforcement bars	26	303	301	751
Hollow steel bars	63	74	172	235
Merchant steel bars	1,031	1,506	3,318	4,982
Iron bars	17	17	89	54
Iron slabs	....	....	1	1
Boiler and other plate	26	15	49	66
Sheets, skelp and saw plate	371	1,042	1,207	3,321
Tin plate	23	87	28	126
Structural shapes	1,761	2,168	4,314	5,438
Rails and rail fastenings	201	52	577	331
Welded pipe	109	435	585	1,068
Other pipe	302	127	1,108	265
Barbed wire	444	799	2,340	3,616
Round iron and steel wire	241	420	646	748
Flat wire and strip steel	122	71	355	196
Wire rope and strand	130	116	378	380
Other wire	93	116	159	404
Hoops and bands	1,273	1,077	3,136	4,273
Nails, tacks, and staples	540	620	1,559	2,185
Bolts, nuts, and rivets	18	11	71	52
Other finished steel	31	36	68	111
Rolled and finished steel	*6,822*	*9,092*	*20,461*	*28,603*
Cast iron pipe and fittings	....	10	3	64
Castings and forgings	150	99	374	242
Total	38,393	22,114	86,453	63,457

*Manganese content only.
†Chromium content only.
‡Silicon content only.

MARCH exports of iron and steel, at 261,269 tons, reached the highest level for any month since July, 1929, and surpassed the February movement by 110,085 tons, or 73 per cent. Scrap exports, at 173,165 tons, registered a gain of 75,300 tons over February, while other iron and steel shipments showed a gain of 12,804 tons. The March movement of scrap was the largest for any month in the history of the trade. Japan was the leading buyer, taking 72,549 tons. Italy and the United Kingdom followed, with 31,403 tons and 31,101 tons respectively.

Exports for the first quarter of 1934, at 590,476 tons, were nearly three times those of the corresponding period a year ago. Among the gains which made this showing possible were a 208,855-ton increase in scrap exports, a 23,171-ton rise in rail shipments and a 10,732-ton expansion in the movement of tin plate.

Iron and steel imports in March totaled 38,393 tons, a gain of 12,986 tons over February. Pig iron imports, at 20,674 tons, included 15,786 tons received from the Netherlands, 3341 tons from India and 1129 tons from Canada.

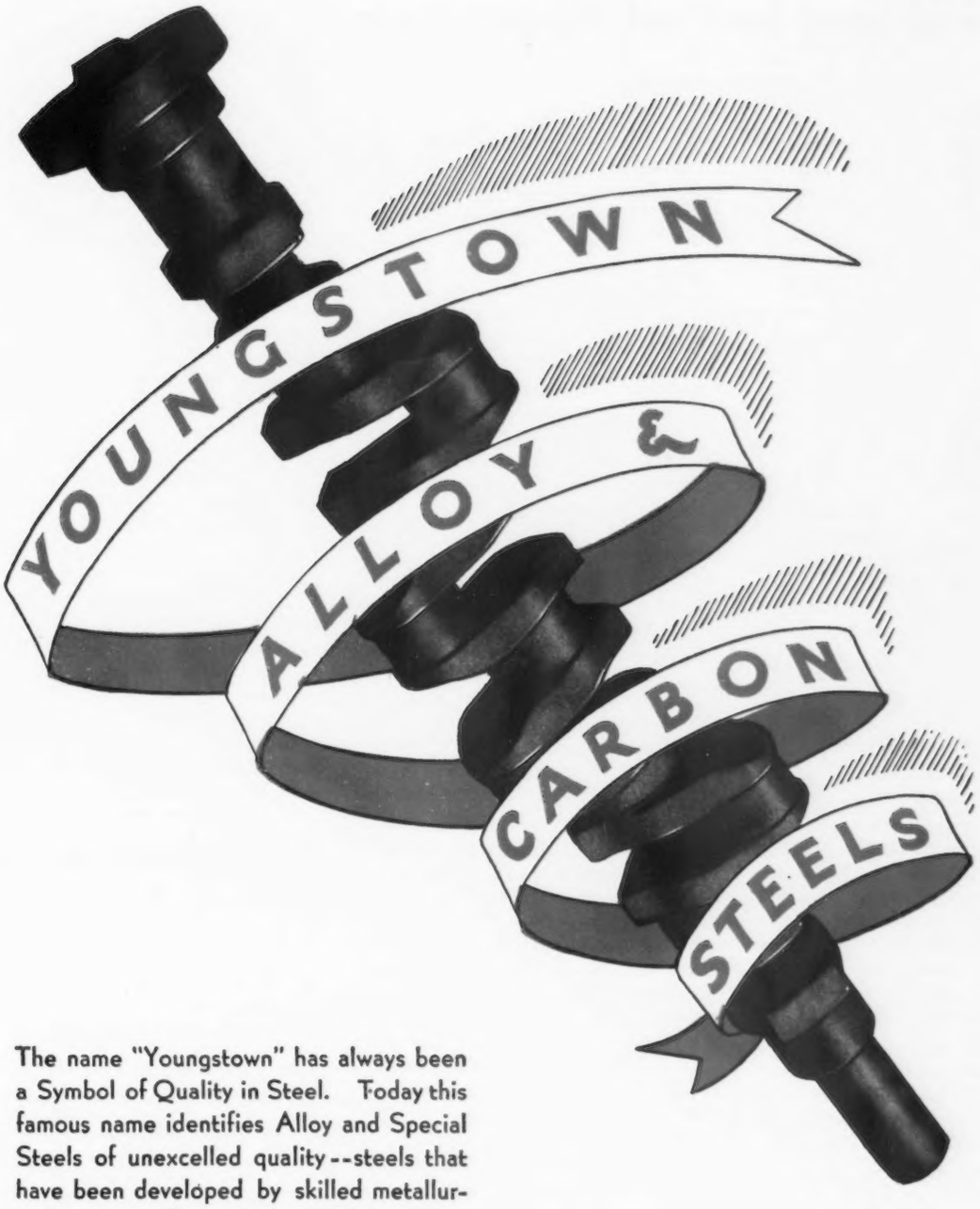
Sources of American Imports of Iron and Manganese Ores

	March		
	Iron Ore		Manganese Ore
	1934	1933	1934
Canada	1,121	....	....
Cuba	11,500	22,000	....
Chile	43,414	....	....
Spain	....	....	....
Sweden	....	....	....
French Africa	14,700	....	....
Russia	8,100	16,200	10,063
India	....	....	2,005
Brazil	....	....	3,717
Africa	....	....	526
Other countries	218	7,072	....
Total	79,053	45,272	16,312

United States Imports of Pig Iron by Countries of Origin

(In Gross Tons)

	March		Three Months Ended March	
	1934	1933	1934	1933
United Kingdom	50	....	100	150
British India	3,341	3,949	12,244	9,628
Germany	....	100	....	134
Netherlands	15,786	2,412	27,468	9,977
Canada	1,129	50	2,900	419
France	....	....	....	....
Belgium	50	....	50	....
Norway	....	....	....	....
Sweden	200	2,803	200	2,803
All others	118	....	375	1,063
Total	20,674	9,314	43,337	24,174



The name "Youngstown" has always been a Symbol of Quality in Steel. Today this famous name identifies Alloy and Special Steels of unexcelled quality--steels that have been developed by skilled metallurgists and manufactured by steel specialists to the highest standards of the industry.

THE YOUNGSTOWN SHEET AND TUBE COMPANY
Manufacturers of Carbon and Alloy Steels
General Offices - YOUNGSTOWN, OHIO

YOUNGSTOWN

Selection of Steel for Plant Applications

(Concluded from Page 24)

adoption. The physicals of untreated alloy steels are not reliable, depending as they do on the amount of work done on the steel at the mill and the final rolling temperature. As it is sometimes necessary to substitute one alloy steel for another the list shown in Table II gives possible substitutions.

When circumstances require special properties an alloy steel is usually adopted, and for the great majority of problems a choice may be made from a relatively small number. A good carbon steel, of proper carbon content and correctly treated can cover a vast field of requirements, and the data shown in Table III give a suggested set-up for standard machine steel specifications adapted to general shop work. In addition, the information given in Table IV will serve as a guide to the relative machinabilities of some carbon and alloy steels.

Choice of Tool Steels

As in the field of machinery steels so is there available today a wide choice in tool steels. Here again all the particular circumstances of the job must be considered in selecting the steels, and generalization is even more difficult and less helpful. For general shop practice, tools may be divided roughly into three classes, comprising (1) cutting tools, (2) shearing tools, and (3) forming tools.

A cutting tool must resist wear, pressure, and heat, although mechanical means may be used to lessen the effects of all three of these conditions, namely, by alteration of the rake angle of the tool and the use of a coolant. The needed qualities in the tool are opposed to each other. Hardness to resist wear means brittleness which will be susceptible to the pressure, while the heat generated will tend to destroy the hardness. It may be noted here that in all classes of work the tool set-up, the nature of the tool support, the section of the part being machined, and the nature of the material being machined determine the necessary toughness of the tool to resist the shocks imposed upon it.

In the field of cutting tools carbon steel finds wide application as it develops a hard case and tough core. It cannot, however, withstand much heat. The addition of vanadium or chrominum or both of these elements tends to toughen the steel and impart a deeper and more uniform hardness. Where the service is not heavy, and for small tools subject to abuse carbon steel will answer the purpose, and it is also much used for finishing cuts.

High speed steel, however, is now the most generally used material for cutting tools. The type most used is the 18-4-1 type, viz. 18 per cent tungsten, 4 per cent chromium, 1 per cent vanadium. High-speed steel, in addition to its cutting properties and ability to hold an edge at high temperatures, has a very high resistance to abrasion. A further development is cobalt high-speed steel, wherein the cobalt addition increases to a remarkable degree the cutting efficiency of the tool. It also increases the wear resistance and the red hardness, and one of its chief applications is for machining hard scaly material. However, this steel is subject to decarburization in any heating cycle and this may prove objectionable in cases where the tool cannot be ground after treatment. Tools made of any high-speed steel should be well backed up.

Shearing tools may consist of regular shears, punches or blanking dies. For simple shears abrasive wear must be provided against, and for this purpose use can be made of the high carbon high chromium types. Where it is not possible to properly reinforce the shear blade, toughness may be secured in the blade itself by the use of a chrome vanadium type steel. For hot shearing high-speed steel if backed up will stand up well, otherwise resort must be had to the tungsten hot work steels.

Another field of use for carbon steels is for punches as the hard case gives wear resistance and the soft core gives necessary toughness. In special cases where the punch can be held very rigid it is possible to use either a high carbon high chromium or a high-speed steel punch.

In most cases blanking dies call for a non-deforming steel, and the manganese oil hardening type answers this purpose. For dies of intricate shape the high carbon high chrome steels are used. Since both these types are oil hardening the warpage is small. Where the die is of intricate shape and with sections liable to cracking there can be used the cobalt high carbon high chrome steel which will harden very satisfactorily in air. Where the chief requirement is resistance to abrasive wear either a high-speed steel pack hardened or a high carbon high chrome steel will serve. For hot work either high-speed steel or tungsten hot work steel may be used.

In most cases shock is the principal factor to be considered in respect to forming dies, and toughness counts for more than heat resistance or wear resistance. These requirements provide a field for the chrome-vanadium, chrome-nickel, and chrome-nickel-molybdenum steels. For deep drawing dies and cold forming the characteristic hard case and tough core of carbon and carbon-vanadium steels are most important. A grouping of standard stock to cover general shop work is given in Table V.

Tool steels are used fairly widely for machine parts. Straight carbon drill rod with carbon 1.00 to 1.20 per cent and high speed drill rod are perhaps the most used. Ball and roller bearing parts are subjected to wear without much shock and for them are used deep hardening tool steels. Chrome-vanadium steels of 0.50 to 1.00 per cent carbon are used for grinding machine spindles, while the carbon - vanadium, carbon - molybdenum-tungsten and the high carbon high chromium types are all finding duty as machine parts.

Rhode Island Tool Co. Observes Centenary

THE Rhode Island Tool Co., Providence, is this year celebrating the one hundredth anniversary of its founding. The company had its beginning in a small bolt and nut shop near Pawtucket, R. I., operated by Joseph Arnold. In 1844 the company became known as William Field & Co. and two years later removed to Providence. The company was incorporated as the Providence Tool Co. in 1847. This organization took over the Providence Forge & Nut Co. in 1857 and produced, in addition to bolts and nuts, a wide variety of items, including builders', mill and ship hardware and agricultural implements. The present company was organized in 1883, taking over the entire business of the Providence Tool Co.

Steel Boiler Orders Higher During March

NEW orders for steel boilers during March, as reported to the Bureau of the Census by 68 manufacturers, totaled 343,918 sq. ft., as compared with 201,966 in the preceding month and with 234,507 in March, 1933. In the first quarter orders amounted to 766,069 sq. ft., as against 542,558 sq. ft. in the corresponding 1933 quarter.

BASOLIT
Pickling Tanks

Here is a Basolit Pickling Tank in action! The kind of action that demands a good tank. Low carbon strip steel travels continuously through this 240 foot tank filled with sulphuric acid and corrosive fumes. It is the kind of service Basolit Tanks are made for because they are leak-proof, wear-proof, and they resist all commercial acids.

This Basolit Pickling Tank was installed at the plant of The Otis Steel Company in Sept. 1932, and an average of 1600 tons of strip steel per week are pickled in it. In this period there have been no maintenance costs.

Otis has two other Basolit Pickling Tanks. The performance of the first one sold the other two. Why don't *you* consider the economy of pickling the Basolit way?

NUKEM PRODUCTS CORP., Buffalo, N.Y.

NEW YORK PITTSBURGH LOS ANGELES TORONTO, ONT.

Manual Dexterity and Machine Art

(Concluded from page 13)

Those admittedly made more jobs for more workers. All *new* machines are the scare devils, but such is history and human nature.

The resort to hand shovels by the C.W.A. when available steam shovels stand idle, as well as the destruction of crops while people starve, is a hysterical reversion that will defeat our averred purpose of spreading employment during this emergency. However, machines are short lived; very few rust or wear out—they become obsolete on the floor by the invention of better machines. This is a beneficent circle, prolific with rewards of new jobs for skilled mechanics. This unearned increment pays higher wages to all good workers, while it supports the misfits where they will do the least harm.

Codes and restrictive labor laws are compelling complete mechanization of industry and forcing the elimination of all common labor, while employers' liability and accident compensation, unemployment reserves, and old age pensions, minimum wage and maximum hour laws, collective bargaining, and now the Wagner-Federation of Labor Disputes Board will necessitate full automatic machinery for the production of all consumer supplies.

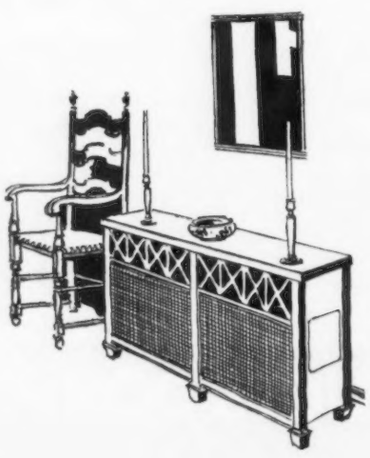
The richest opportunity for American labor today lies in the making of labor-saving machinery for dullards to operate, rather than products which may be ground out by impotent operators. Of the fifty million potential manual workers in this country, forty million are making, maintaining, or using machines in their livelihood, including the spectacular five million operators, and even their ultimate prospects are enhanced by improved machine opportunities. There are only ten million hand workers still producing consumer goods and this number is diminishing by annual promotions. In trying to protect the few unfit, let us not destroy the many fit. Capital has always supported the unemployed and the indigent; they are always with us.

Like it or not, America's principal occupation has shifted from chipping flints, rolling cigars, and pegging shoes to building machines that shoot out these commodities to supply an increased demand. We old conservatives would better accept this accelerating shift from consumer goods to capital goods and adapt it to our salvation. Of course, economic readjustments always expose dullards to hardships, but this is a blessing in the long run—only a quarter of us remain dullards instead of three quarters, as in those countries that have no machines. The Orient made her goods by hand; the Occident makes machines by hand which produce goods for the world.

When NIRA codes the manipulators of labor and pickets the plunderers of capital, America's skilled mechanics will restore prosperity and happiness to our nation.

Under our system of modern mass production, precision and interchangeability actually save time and money over sloppy, inaccurate work. A new engine costs less than the labor required to repair the old one. Nowadays raw materials must be more accurate and must be stronger in order to withstand the increased fabricating stress that is imposed by high speed machines. This practical test sets higher standards of quality and endurance than the finished articles require. Our mills produced successive lots of steel which the metallurgical chemists analyzed and pronounced identical, but in our high speeded multidraw presses one lot succeeded while another failed. Now the spectrograph records to a ten-thousandth of one per cent each of the 93 possible elements present and thus do machines compel, discriminate, and fulfill the highest standards.

No machine ever produced a masterpiece that could not be improved by a master hand. Take, for example, the hardened steel plates surfaced and lapped true on a Norton Precision Grinder—their truth tested to one-millionth of an inch, with spectroscopic light waves, through a *hand*-lapped optical glass. Even that infinitesimal inaccuracy of one millionth can be reduced by exquisite *hand*-lapping; but this handwork can not be further improved by machinery. In the last analysis, the hand is man's highest appeal. This is the ideal relationship for both handicraft and machine perfection. When the hand loses its cunning, the whole scheme fails. Our legs may atrophy as the automobile is perfected, but if our hands atrophy, we shall degenerate in all branches of evolution.



Science is now amplifying all our senses to fourth dimensions, enabling us to record and utilize vast zones of vibrations that our untrained nerves never sensed before. But there is no substitute for the sense of touch, nor royal road for coordinating our fingers with our brains.

Three centuries ago the Royal Society was founded to promote the "vulgar arts." At that time craftsmanship and the fine arts were one. The ranking craftsmen were the great artists. In his own day Leonardo da Vinci was the engineer, Michelangelo the builder, Benvenuto Cellini the metal craftsman, Holbein the goldsmith, Zuloaga the royal Spanish swordsmith, and Albrecht Dürer the mechanical draftsman. But *they* did not cater to the masses. Subsequently mass production in factories and mass training of artists in art schools divorced art from industry. Class aristocracy arose. Artists scorned factory mass production, and the craft guilds founded on manual dexterity disappeared. Apprenticeship systems and then trade schools served well, but modern artists are not craftsmen. If they are sculptors and draftsmen, they do not draw what we realists see with our eyes.

Manufacturers must deal with realism, science, mechanism, and functional engineering design rather than with romanticism and emotionalism. Although romance serves no place in machine design, a scientifically designed machine is full of romance and imagination to mechanical engineers, as well as to mystics, cubists, plastic poets, and other "wild animals."

Ugliness, whether expressed on canvas or machine products, is an offense against civilization, and two ugly objects are twice as harmful as one; while the mass production of a number of ugly objects for wide distribution is a matter of serious public concern. Twenty million of those ugly "Tin Lizzies" were extruded by that great Ford chain system of mass production, disfiguring the highways

(Continued on page 82)

The Superintendent said -

"Three big words in the steel industry are—

QUALITY—TONNAGE—
and COST

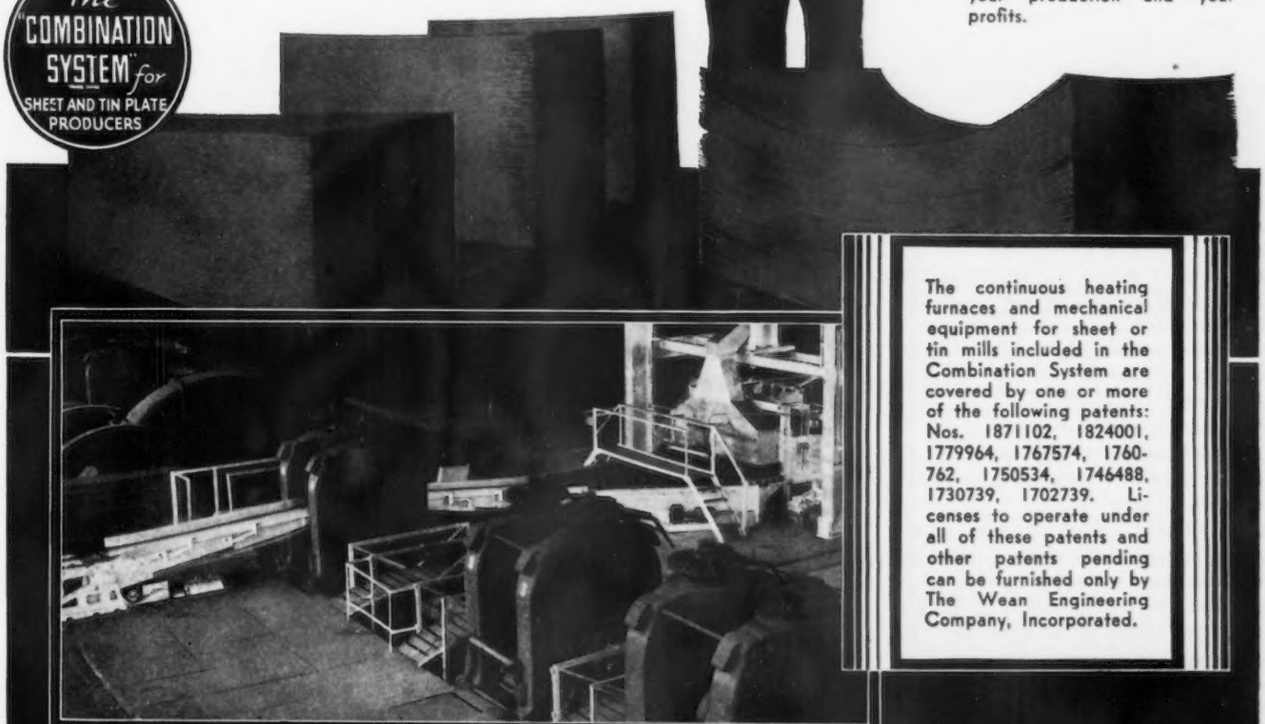
QUALITY always comes first and with big TONNAGE produced on efficient equipment a LOW COST is assured.

The illustration below shows the flatness of the finished sheets which were rolled on the Wean Engineering Company's Combination system. Compare the flatness of these sheets with that of those on the right which were rolled on other equipment. The Wean equipment thus eliminates the expense of extra roller flattening as well as cambered edges.

Flat sheets also permit more accurate shearing to specified sizes at lower shearing cost.

Our engineers will be glad to show you how the installation of this most modern equipment will make it possible for you to not only meet competition but to increase both your production and your profits.

The "COMBINATION SYSTEM" for SHEET AND TIN PLATE PRODUCERS



The continuous heating furnaces and mechanical equipment for sheet or tin mills included in the Combination System are covered by one or more of the following patents: Nos. 1871102, 1824001, 1779964, 1767574, 1760762, 1750534, 1746488, 1730739, 1702739. Licenses to operate under all of these patents and other patents pending can be furnished only by The Wean Engineering Company, Incorporated.

The WEAN ENGINEERING Company, Inc.

Warren, Ohio

FLINN & DREFFEIN CO. • *Associated Companies* • THE McKAY MACHINE CO.

(Continued from page 80)

and dragging the design of roadside "hot dog" shanties and garages down to their level. However much we criticized this product, civilization owes a debt of gratitude to this marvelous production system. The fault lay in the product design, not in the system, but times have changed and we read that even Soviet Russia has decreed to punish every manufacturer of shoddy, ugly goods with five years imprisonment.

The reason manufacturers do not now make all quantity products beautiful works of art is because they really have not tried, not because they cannot; but the day is coming when all common things of life will be not only efficient but appropriately beautiful, and some great art industrial federation will utilize glorified mass production systems and thus enable all families to possess "museum specimens" in their own homes. Art museums will become the active coordinating, cultural centers of the next generation of artist designers.

We all naturally dislike things that we do not understand and traditional connoisseurs of the fine arts may not be able to recognize art in a modern locomotive, even while they extol a grotesque painted caricature of that same locomotive, because it expresses to them a mystic spirit of speed and power. The "Deacon's Wonderful One Horse Shay," that machine immortalized by Oliver Wendell Holmes, may have embodied elements of real art, while a Picasso painting of it might not.

Between efficiency of function and harmony of proportion there is a correlation which is deeper than surface beauty, and when expressed in the crank assembly of an aeroplane engine, fine art connoisseurs begin to split hairs, admitting that a machine might be a work of art but its product—never. This engine is both a machine and a machine product, so the poor art museum director is in a quandary whether to exhibit machines, products, or what have you. With our thousand and one definitions of art we begin to wonder what worthwhile endeavor, expression or motion is not art. Meanwhile industry is striving to refine the design of all manufactured products; to make the practical beautiful and the beautiful practical. But in this attempt manufacturers need the help of both artists and buyers, as painfully evidenced by these "extreme-line" automobile fenders.

Art training should alternate with craft training, and the "handiarts" and handiworks continue to go hand in hand, for art is the process of making common things better. There should be the closest possible cooperation between our institutions of fine arts and our industries, for the benefit of both. We laugh at mid-Victorian furniture and Civil War architecture, but the design of our modern radio cabinets, ugly telephone instruments, and railway trains should command our whole-souled attention.

The widest field for the dissemination of culture and beauty lies in the industrial products of this machine age, and the engineers who create and design machines and merchandise for distribution to the masses deserve the wholehearted cooperation of art patrons. The mass products of nature are recognized as presenting the highest qualities of art and beauty, in minute detail, while our common-place, low-priced manufactured products, which are made in vast quantities, seem to have been overlooked by the cultural art institutions, which have held the keys to the situation. We agree with Ruskin when he declared that the chief errors in art consist of losing or exaggerating either skill or beauty or use; that we cannot substitute mechanism for skill, photograph for a picture or cast iron for sculpture. Modern designers would not do that and Ruskin would generously add the other half of the truth if he were living today.

The machine is freeing us from outworn traditions and at the same time bringing masterpieces into the homes of all workers—literature by cylinder printing presses, music by radios, drama by movie-tones, health and comfort by "conditioners." What an opportunity for our institutions of art, of music, of literature, and of religion to lead mankind to higher living!

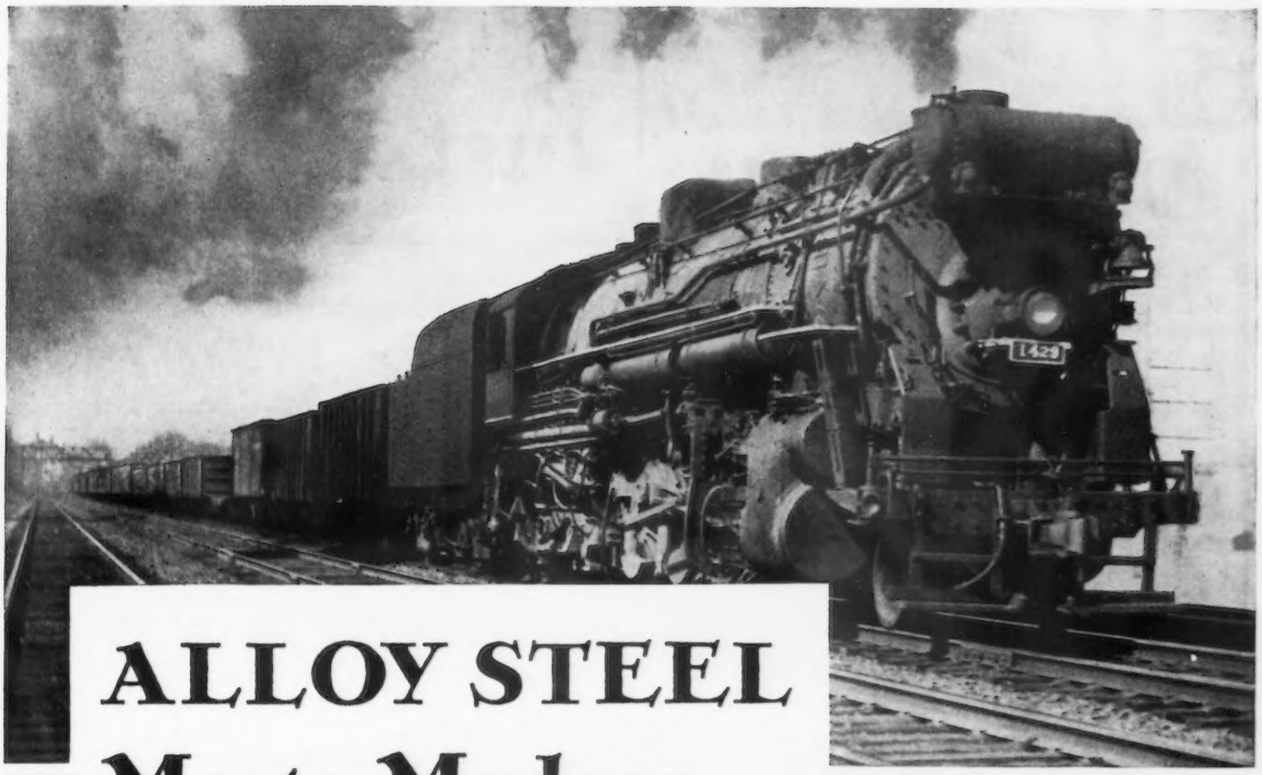
Who is educating the public to demand and to choose the finer houses, furnishings, and other expressions having art qualifications that will live beyond today's fashion? While waiting for the fine art museums to rise to this opportunity, manufacturers are establishing their own specialized industrial museums, and making them popular, interesting, and educational. Such a museum was opened in Worcester, Mass., three years ago.

The industrial museum at the plant of the Worcester Pressed Steel Company is a library, research laboratory, and a collection of pressed steel products from all places and all times, established with five purposes in view: to interest and inspire the present steel workers; to restore the zeal of craftsmanship to the machine operator; to exalt steel trades and extol steel products; to attract superior recruits for the future; and to inform the public in their choices. Here the press operator sees in the completed product the value of his own labor and his contribution and relation to the onward march of industry. He compares his product with masterpieces of the past, his facilities and rewards with those of his predecessors in this his chosen trade. He catches the romance of history, the demands of the present, and the call of the future.

For example, perhaps no class of utilitarian products recalls more vividly the romantic and the beautiful, amid stirring events of history, than do these superb masterpieces of the Medieval Armorer who wrought, not in soft gold and silver, nor yet in bronze, which was melted and cast, but in steel, that most intractable but rewarding of metals. The best armor was designed and wrought by world renowned artists, and was more highly prized than were the best pictures and statues.

We steel workers recognize steel to be man's working medium *par excellence*. Its strength, adaptability and abundance, its beauty of sheen and texture, surpass every other metal for man's supreme expression—machine art. We wonder why artists confine their talents to canvas and oil reproductions.

A new service for the manufacturer which keeps him advised month by month of the progress and availability of new inventions in his field has just been announced by Inventions Digest, Inc., Chicago. Inventions Digest collects descriptions of recent inventions from patent attorneys and reports news of these inventions to manufacturers who subscribe to the service. Subsequent negotiations for sale or licensing are handled direct between the manufacturer and the inventor's attorney.



ALLOY STEEL Meets Modern Power Requirements

To meet the demand for increased power, locomotive builders are turning definitely to Alloy Steel as a means for supplying the greater capacity necessary without additional weight.

Providing lighter and stronger equipment, the use of Alloy Steel has gained universal recognition as the best modern practice. Its superior strength and resistance to abrasion, impact, shock and distortion eliminate dead weight and assure longer life to parts and greater general operating efficiency on the road.

Electromet Engineering Service has specialized for many years in the development of alloys and metals to meet existing service needs. The advice and assistance of this organization are yours for the asking. Write today for further information and additional facts of interest.

ELECTRO METALLURGICAL SALES CORP.
Unit of Union Carbide UCC *and Carbon Corporation*
Carbide and Carbon Building, 30 East 42nd Street
New York, N. Y.

PRODUCT OF A UNIT OF UCC UNION CARBIDE AND CARBON CORPORATION

Users of products and processes developed by Units of Union Carbide and Carbon Corporation benefit from a most unique coordination of scientific research with manufacturing, sales, and service facilities. You are cordially invited to visit this summer the numerous exhibits sponsored by the Corporation in both the Basic and Applied Science sections in the Hall of Science at Chicago's 1934 A Century of Progress Exposition.

Electromet
Ferro-Alloys & Metals

DUST *is an* Expense!!

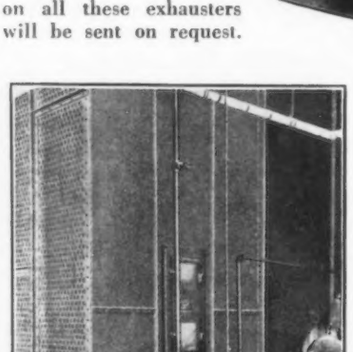
Put DUST on the list of "Expense Items" to be eliminated in your plant! Frequently unaware of the extent to which dust is a menace, industrial management pays a heavy price for tolerating it. Set your plant free from this annoyance and expense.

Methods of Elimination

Where cleaning, buffing, grinding or similar process is the primary cause of dust, a simple system of hoods with an efficient exhaust fan will remove this dust at the source. Buffalo Mill Exhausters are particularly suitable for this kind of service. Where due to the nature of the product or process dust is present all thru the plant, a central ventilating system in connection with a Buffalo Air Washer will give excellent results.

Exhaust Fans

Buffalo Mill Exhausters are made in Standard and Slow Speed types. Slow Speed Fans have very high efficiency, are very quiet. Other exhaust fans include Volume Fans, cast-iron construction; and BREEZO Electric Disk Fans. Full details on all these exhausters will be sent on request.



AIR WASHERS

Buffalo Air Washers are well known all over the world for high air-cleaning efficiency. Every cubic foot of air which passes thru a Buffalo Air Washer is actually WASHED with water, so that dirt and dust is removed.

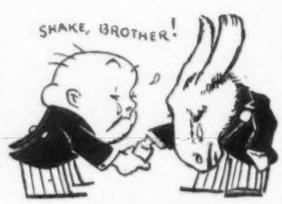
Buffalo engineers, located in all principal cities, will be glad to advise you relative to dust problems. Write us today.

BUFFALO FORGE COMPANY
492 Broadway Buffalo, N. Y.
In Canada: Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

"Buffalo" for DUST Elimination

Just Between Us

Fatheads and Jackasses

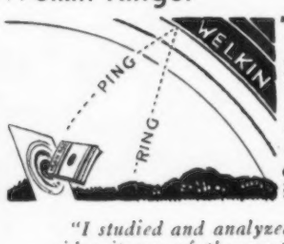


MOST letters we get are conventional. But once in a while we get one from a man who writes as he talks, as, for example, the one from the choleric individual who complained about one of the many varieties of error we manage to perpetrate in our ingenious way. It began, "What fathead in your organization . . . ?"

Here's a natural that came in just yesterday:

"Permit me to apologize for neglect in paying our subscription bill. Check is enclosed. Your previous statement was passed on to a jackass in our organization with instructions to check and pay."

Welkin Ringer



THAT article in the Mar. 29 I.A., "Common Sense Applied to Price Levels," made the welkin ring. Sometime we are going to find out just what a welkin really is. Anyway, hardly a day goes by that we don't get a flock of requests for clippings of it and compliments on it. Sample:

"I studied and analyzed it very carefully and I consider it one of the most illuminating and interesting presentations of the relative price levels that I have ever seen.

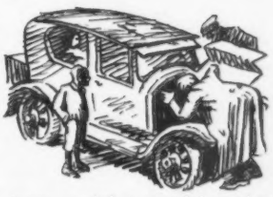
"I wish to commend you on the very enlightening and educational articles that have recently been appearing in your magazine."

Iron Age Advertiser Wins Honors

JUDGES at the Art Directors' Club's annual exhibition liked these two Climax Molybdenum advertisements so much that they were awarded special honors. N. W. Ayer & Son, the advertising agency, prepared them. Congratulations to both Climax and Ayer.

Us Two.....

We Are in the Market for a Car



NO longer does it matter that the horn on our 1928 car won't sound any more. The engine heralds our approach five hundred yards ahead. The neighbors' children yell at us as we pass. We are making cautious inquiries about the new cars.

Our inquiries are confined strictly to the men that own them, as we have a faint suspicion that the dealers are biased.

We have nothing but admiration for the salesman who swears his brand is the best in the world, for if he had less than a wholesouled enthusiasm for his own product, he would probably be a pretty poor salesman. But we place more stock in the user's opinion.

Accordingly, we are sympathetic toward those advertisers who are influenced more by what the trade paper reader says about the trade paper than what the advertising salesman says. You know, there was a time when a bottle of Overholt, judiciously used, and a flock of good stories, but not too good, went a long way.

But no longer. A dollar spent for advertising comes out of the same till that pays for wages and material, and must pull its weight. So the shrewder of the men who have to make an advertising dollar go as far as possible have developed the mean habit of going direct to you, the trade paper reader, and finding out what publications you prefer.

You have probably received one or more of these questionnaires. They contain a list of trade papers and you are asked to indicate which you find most useful.

Of course, this method takes a lot of the romance and blue sky out of selling advertising, but it does clear up wonderfully the confusion in the mind of the advertiser after hearing seven salesmen swear that seven different papers are the publication without which the industry would shrivel up like Dr. Jekyll after taking the mysterious drug for which all London was searched in vain.

The advertiser actually knows which paper his customers and prospects like the best. Guesswork is eliminated. It's like buying coal on chemical analysis. You know what the ash content is and how many B.t.u.'s you get for your money.

The Iron Age fares pretty well in these investigations. It rarely fails to come out on top by a healthy margin. When a paper comes in far down the list, all the salesman can say is, "Investigations don't mean anything." If he can get away with it, and the funny thing is that sometimes he does, all we can say is that he is a swell salesman, and that if he had been Hoover's campaign manager, Hoover would still be in the White House, even after the votes were counted. "Votes don't mean anything. They still want Hoover."

But when we trade in our flat-backed veteran of a hundred sideswipes it will be for a car more highly praised by users than by sellers.

And Be Quick About It

ANY day now you'll hear that Dillinger has given the Chicago police twenty-four hours to leave town.

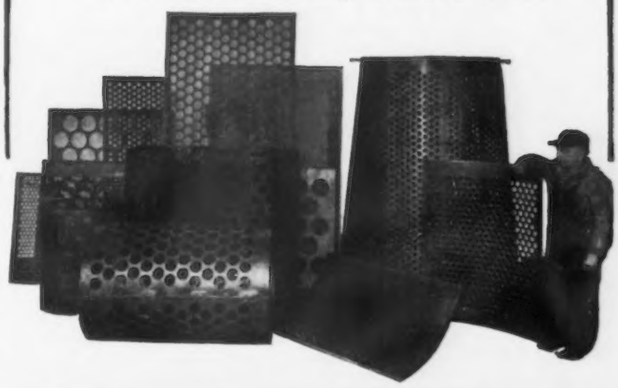
CONTINUED ON NEXT PAGE

SCREENS
of Perforated Metal

For a Thousand Uses

For Grain, Minerals, Chemicals or any other material to be screened
Ornamental Designs for Grilles, Cabinets, etc.

Any Metal—Any Perforation



The Harrington & King PERFORATING Co.

5657 Fillmore St., Chicago, Ill. 114 Liberty St., New York, N.Y.

Good Screens Are Made in the Die Shop

REG. U. S. PAT. OFF.

To those not actively engaged in making perforated plate it may well seem that the most important operation in the process is the perforating. Perhaps it is, but here at Carbondale we have always felt that good perforated plate was made in the Die Department.

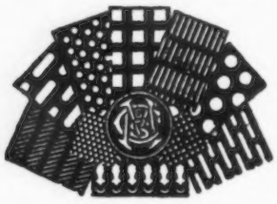
No perforated plate can be better than the dies from which it is made. Perhaps that is why we have always been finicky about the machining and preparation of dies, why we maintain what we believe to be the largest and best equipped die department in the industry. Most of our die makers have been with us for so many years that they really merit that much overworked title "craftsmen."

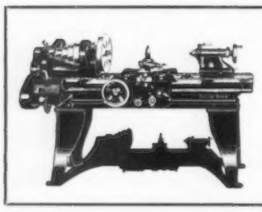
Compare a piece of Hendrick perforated plate with a piece of run-of-mine plate,—the difference began in the Hendrick Die Department.

HENDRICK MFG. CO.

37 Dundaff Street Carbondale, Pa.

Baltimore, Birmingham, Boston, Cincinnati, Cleveland, Detroit, Hazleton, New York, Philadelphia, Pittsburgh

MUNDT
PERFORATED METALS
Large stocks of all metals always in hand ready to punch for any arrangement of perforations.
Sixty-one years of manufacturing perforated metals for every conceivable purpose assures satisfaction.
Write for Catalog of Patterns

TIN, STEEL, COPPER, ALUMINUM, BRONZE, BRASS, ZINC, ANY METAL, ANY PURPOSE
CHARLES MUNDT & SONS
50 FAIRMOUNT AVE., JERSEY CITY, N. J.


SOUTH BEND LATHES
The lathe shown here is the 16" x 6' Quick Change Gear Back-Geared Screw Cutting Precision Lathe with Countershaft Drive, price $540. On Terms, if desired. 96 other sizes and types of lathes from 9" to 18" swing, $75 to $1500, are shown in New General Catalog No. 94. Write for copy.
SOUTH BEND LATHE WORKS
325 E. Madison St., South Bend, Ind.

LELAND-GIFFORD COMPANY
Worcester, Mass.
Drilling Machinery
Belt and Motor Spindle
One to Six Spindles
Tapping Attachments and Multiple Heads

Cone 4-Spindle Automatics
Are economical and accurate producers of screw machine parts up to 6" diameter 7" milling length. They cut costs, increase production, boost profits.
Write for particulars
CONE AUTOMATIC MACHINE CO., Inc.
WINDSOR, VERMONT
REPRESENTATIVES:
Detroit: J. C. Austerberry's Sons, 634 E. Congress St., Detroit, Mich.
Chicago: John H. Glover, 2127 North Sayre Ave., Chicago, Ill.
Ohio: S. B. Martin, 1077 Erie Cliff Drive, Lakewood, Ohio.
New England: Potter & Johnson Machine Co., Pawtucket, R. I.
Indiana: G. A. Richey, Chamber of Commerce Bldg., Indianapolis, Ind.
New York State: Syracuse Supply Co., Syracuse, N. Y., also Rochester, N. Y.
Pennsylvania: Arch Machinery Co., 1005 Park Bldg., Pittsburgh, Pa.
Philadelphia: Lloyd & Arms, Inc., 133 South 36th St., Philadelphia, Pa.
California: C. F. Bulotti Machinery Co., 829-831 Folsom St., San Francisco, Calif.

CONTINUED FROM PRECEDING PAGE

We're Tired of Boyscouting

SOMEWHERE in this convalescent land there's an Iron Age subscriber who forwards every week his copy of The Iron Age and the *New Yorker* to A. E. Donovan, P. O. Box 156, Florence, Mass.

Now, we don't object to that. In fact, the more readers per copy, the better we like it. We even furnish our subscribers free of charge with routing slips that will enable one copy to do the work of five or six, which helps make our statement that The Iron Age has over 50,000 readers more than a mere hope.

But what we are kicking about is that Mr. Donovan's friend sometimes forgets to put enough postage on the envelope. And, as he mails the copies in the envelope in which he gets The Iron Age, the post office sends the copies back to us. This is the second time we have had to dive into the till for due postage so that Mr. Donovan will get his copies.

The next time Mr. Donovan's friend underpays postage, will he kindly mail the copies in a *New Yorker* envelope, to split expenses? They are just as prosperous as we are.

Mystery

FOR the second time in the past several weeks an anonymous sender has returned, in one of our self-addressed envelopes, a large piece of wrapping paper, covered with disjointed words.

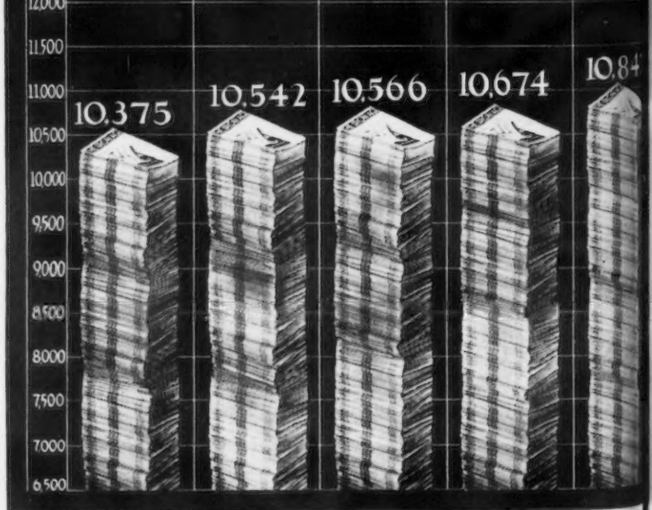
The one just received reads, "Mails—familiar—persons—Inspectors — Americas—Manufacturers — John — Telephon — Comparison — persons—families—inventions — Gray—Bell—No reply requested—Scalloped Edge Pies—Nurse Marguerite Smith—Scientific Application Register—Advantage—Perhaps—Right of Mesne —Ambition—Monrose—Inventor—etc., etc."

Is there a psychiatrist in the house?

Weekly Blurb

APRIL was the tenth consecutive month in which we could beamingly inform those in the carpeted offices that we had more subscribers than we had the month before. But they haven't said anything yet about a raise.

Rising! In the past ten months The Iron A



READER INTEREST INVESTIGATIONS

Conducted Independently by Advertisers

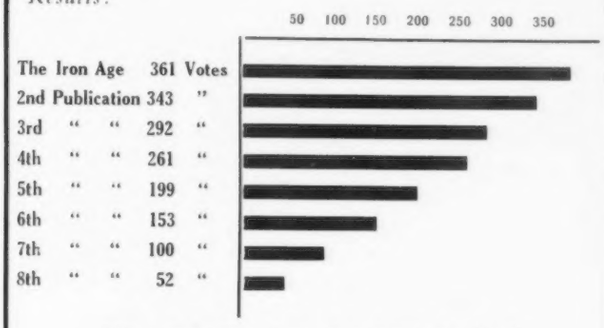
(NO. 1 OF A SERIES)

Manufacturer's Product: Cutting Tools.

Purpose of Investigation: To ascertain which trade papers users of small tools actually read.

Method of Conductng Investigation: The cutting tool manufacturer directed his salesmen to ask cutting tool users which trade papers they actually read.

Results:



Why does The Iron Age head the list?
Fifty thousand readers is one reason.

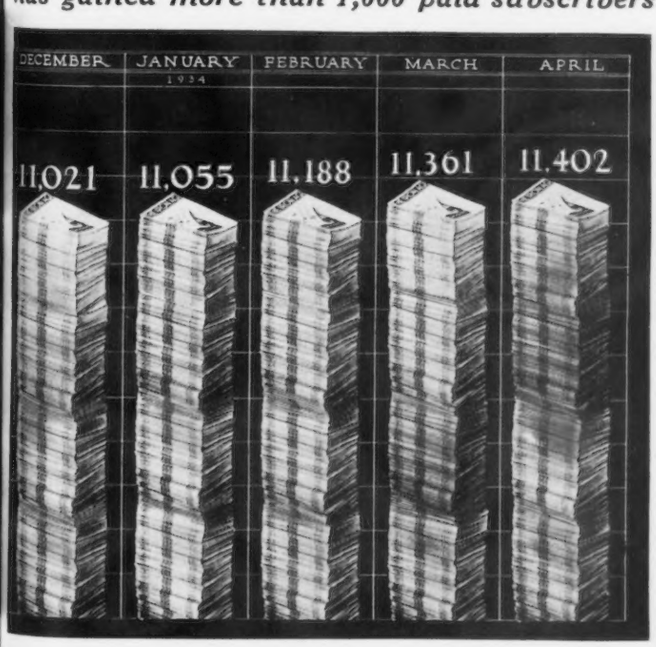
Height of Something or Other

FROM Dun's financial register we learn that the Benj. P. Forbes Company, Cleveland, manufactures window cleaners and chocolate specialties. Gawd forbid that they ever get the formulas mixed!

Bouquets

CONGRATULATIONS to the Carboloy Co. on that striking illustration and headline, "150 Horsepower Under the Hood—But Wagon Wheels on the Axles!" on page 51 of Apr. 26 I.A., and to The Wallace Barnes Co. on that beautiful photograph on page 49 of the same issue.

has gained more than 1,000 paid subscribers



17 STYLES AND SIZES
MERRELL
PIPE THREADING for BETTER threads MACHINES
TOLEDO, OHIO

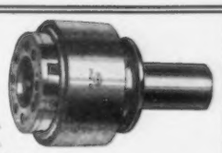
ARMSTRONG "C" CLAMPS
Drop forged from special steel. Alloy steel screws with double-wear threads. Extremely stiff, they will not slip or spread. 5 types. All sizes. Recognized as the finest clamps made.
Write for Catalog
Armstrong Bros. Tool Co.
"The Tool Holder People"
309 N. Francisco Ave., CHICAGO, U.S.A.

Emery Wheel Dressers
Two Sizes CUTTERS Nos. 1-2
We make the regular Huntington (Pattern) for all sizes, Roughing for Nos. 1 and 2. Paragon for No. 1 only.
GEO. H. CALDER CO., Lancaster, Pa., U.S.A.

Cutting-Off Machines
—for thin and thick wall steel tubing and bars
BARDONS & OLIVER
Cleveland, Ohio
We also manufacture a large line of turret machinery for finishing cast iron, steel and brass

ABRASIVE SURFACE GRINDER
Either Horizontal or Vertical Spindle Type
Countershaft or Motor Drive
Get our bulletin for particulars
ABRASIVE MACHINE TOOL CO., East Providence, R. I.

THE CLEVELAND STEEL TOOL CO.
Punches. Dies. Chisels. Rivet Sets
660 E. 82ª St. Cleveland, O.
If it's RIVETED you KNOW it's safe

H&G DIE HEAD
CUT THREADS
BETTER
QUICKER
CHEAPER

Sizes and Styles for All Machines
THE EASTERN MACHINE SCREW CORP.
21-41 Barclay St., New Haven, Conn.
Pacific Coast Representatives:
Los Angeles, A. C. Behringer, 312-316 Commercial St., Los Angeles, Cal.
San Francisco, A. H. Coates Co., 1142 Howard St., San Francisco, Cal.

Cutting Off Machines for Sawing All Kinds of Metals
THE ESPEN-LUCAS MACHINE WORKS
FRONT AND GIRARD AVE. PHILADELPHIA, PENNA.

GRIFFIN

COLD ROLLED
STRIP
STEEL

½" to 19" wide.
.002" to .500" thick

Desired Quality for Forming and Drawing

NEW YORK WAREHOUSE—Wm. H. Leonori & Co., Inc., 30 Howard St.
CHICAGO WAREHOUSE—Central Steel & Wire Co., 4545 South Western Blvd.
DETROIT—J. B. Tramer, 18501 Santa Barbara Drive
CLEVELAND — Paterson-Leitch Company, 900 E. 69th Street
BUFFALO—J. J. Lambert, 323 Huntington Avenue
DAYTON WAREHOUSE — Central Steel & Wire Co., 1095 East Monument Ave.
SAN FRANCISCO — Charles L. Lewis, 703 Market Street

GRIFFIN MFG. CO. ERIE, PENNA.

SUPERIOR STEEL CORPORATION

Hot and Cold Rolled Strip Steel in regular carbon steel of all analysis and Stainless metals in Chrome and Chrome-Nickel analysis.

GRANT BUILDING PITTSBURGH, PA.

THE STANLEY WORKS
THE AMERICAN TUBE AND STAMPING PLANT
BRIDGEPORT, CONN.

Hot and Cold Rolled Strip Steel

Representatives: American Rolling Mill Co. of Calif., San Francisco
A. M. Castle Co., Los Angeles — W. J. Coleman, Portland, Ore.
The Stanley Works, 100 Lafayette St., New York City
The Stanley Works, Park Building, Worcester, Mass.
Stanley Steel Co., Ltd., Hamilton, Ontario, Can.

High Grade STRIP STEEL

Stamping and Deep Drawing – Uniform in Quality

Control of the quality begins with the manufacture of the steel in our own Open Hearth and continues through all subsequent processes.

LACLEDE STEEL CO., ST. LOUIS
STEEL WORKS & ROLLING MILLS, ALTON and MADISON, ILL.
OFFICES: Detroit—Chicago—St. Louis—Kansas City

TUNGSTEN & CHROME
MAGNET STEEL
ALSO HIGH SPEED STAINLESS SPECIAL ALLOYS & CARBON TOOL STEELS
Latrobe Electric Steel Co., Latrobe, Pa.

PRODUCTS

ABRASIVE WHEELS — See Grinding Wheels

ABRASIVE CLOTH & PAPER
Norton Co., Worcester, Mass.

ABRASIVES—Steel Shot and Grit
Pangborn Corp., Hagerstown, Md.

ACCUMULATORS—Hydraulic
Baldwin-Southwark Corp., Philadelphia.
Lake Erie Engng. Corp., 68 Kenmore Sts., Buffalo, N. Y.
Wood, R. D., & Co., Philadelphia.

ACETYLENE—Dissolved in Cylinders
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.

ACID-PROOF COATING
Cellcote Co., The, Cleveland.

ACIDS—Pickling
American Chemical Paint Co., Ambler, Pa.
Grasselli Chemical Co., Inc., Cleveland.

AIR TANKS AND CYLINDERS
Scaife, William B., & Sons Co., Pitgh.

ALLOYS—Calcium-Silicon
Electro Metallurgical Sales Corp., 30 East 42nd St., N. Y. C.

ALLOYS—Magnesium
Dow Chemical Co., Midland, Mich.

ALLOYS—Phosphor Bronze
Phosphor Bronze Smelting Co., Philadelphia.

ALLOYS—Silico-Manganese
Electro Metallurgical Sales Corp., 30 East 42nd St., N. Y. C.

ALLOYS—Titanium
Metal & Thermit Corp., 120 B'way, N. Y. C.
Titanium Alloy Mfg. Co., Niagara Falls, N. Y.

ALLOYS—Tungsten
Vanadium Corp. of America, 120 Broadway, N. Y. C.

ALLOYS—Vanadium
Vanadium Corp. of America, 120 Broadway, N. Y. C.

ALLOYS—Zinc Base Die Casting
New Jersey Zinc Co., The, 160 Front St., N. Y. C.

ALUMINUM
Aluminum Co. of America, Pittsburgh.
British Aluminium Co., Ltd., 30 Rockefeller Plaza, R. C. A. Bldg., N. Y. C.

AMMETERS AND VOLTMETERS—Recording
Bristol Co., Waterbury, Conn.

AMMONIA RECOVERY PLANTS
Koppers Construction Co., The, Pittsburgh.

ANGLES, BEAMS, CHANNELS AND TEES
Carnegie Steel Co., Pittsburgh.
Illinois Steel Co., Chicago.
Inland Steel Co., Chicago.
Jones & Laughlin Steel Corp., Pittsburgh.
Ryerson, Jos. T., & Son, Inc., Chicago.
Steel & Tubes, Inc., Cleveland.
Weirton (W. Va.) Steel Co.

ANGLES, BEAMS, CHANNELS & TEES —Magnesium Alloys
Dow Chemical Co., Midland, Mich.

ANNEALING—See Heat Treating

ANODES—All Types
Udylite Process Co., Detroit.

ANODES—Cadmium
Udylite Process Co., Detroit.

ARBORS
Morse Twist Drill & Mch. Co., New Bedford, Mass.

ARRESTERS—Spark
Harrington & King Perforating Co., Chi.

AUCTIONEERS
Industrial Plants Corp. of Ohio, Administration Bldg., Toledo, Ohio.

AXLES—Car or Locomotive
Carnegie Steel Co., Pittsburgh.
Illinois Steel Co., Chicago.

BALLS—Burnishing
Abbott Ball Co., The, 1047 New Britain Ave., Hartford, Conn.

BALLS—Steel, Brass or Bronze
Abbott Ball Co., The, 1047 New Britain Ave., Hartford, Conn.
Auburn Ball Bearing Co., 63 Clarissa St., Rochester, N. Y.
New Departure Mfg. Co., Bristol, Conn.
S K F Industries, Inc., Front St. & Erie Ave., Phila., Pa.

BANDS—Steel
Bethlehem (Pa.) Steel Company.
Inland Steel Co., Chicago.

BANDS—Welded
Amer. Welding & Mfg. Co., Warren, O.

BARRELS—Burnishing
Abbott Ball Co., The, 1047 New Britain Ave., Hartford, Conn.
Globe Mch. & Stpg. Co., Cleveland.

BARRELS—Tumbling
Abbott Ball Co., The, 1047 New Britain Ave., Hartford, Conn.
Baird Mch. Co., Bridgeport, Conn.
Globe Mch. & Stpg. Co., Cleveland.

BARS—Alloy
Republic Steel Corp., Youngstown, Ohio.

BARS—Aluminum
Aluminum Co. of America, Pittsburgh.

BARS—Brass & Bronze
Johnson Bronze Co., New Castle, Pa.

BARS—Cold Drawn
Union Drawn Steel Co., Massillon, Ohio.

BARS—Concrete, Reinforcing
Inland Steel Co., Chicago.
Jones & Laughlin Steel Corp., Pittsburgh.
Laclede Steel Co., St. Louis, Mo.

BARS—Magnesium Alloys
Dow Chemical Co., Midland, Mich.

BARS—Steel
Ames, W., & Co., Jersey City, N. J.
Andrews Steel Co., The, Newport, Ky.
Bethlehem (Pa.) Steel Company.
Carnegie Steel Co., Pittsburgh.
Illinois Steel Co., Chicago.
Inland Steel Co., Chicago.
Jones & Laughlin Steel Corp., Pittsburgh.
Republic Steel Corp., Youngstown, Ohio.
Ryerson, Joseph T., & Son, Inc., Chicago.
Steel & Tubes, Inc., Cleveland.
Timken Roller Bearing Co., Canton, Ohio.
Timken Steel & Tube Co., The, Canton, O.
Weirton (W. Va.) Steel Co.
Youngstown (Ohio) Sheet & Tube Co.

BASES—Column, Machinery
Lukens Steel Co., Coatesville, Pa.

BATTERIES—Storage
Electric Storage Battery Co., Phila.

BATTERY CHARGERS
Cutler-Hammer, Inc., Milwaukee.

BEAMS—See Angles, Beams, Channels and Tees

BEARINGS—Babbitt
Bunting Brass & Bronze Co., Toledo, O.
Cramp Brass & Iron Foundries Co., Phila.
Johnson Bronze Co., New Castle, Pa.

BEARINGS—Ball
Auburn Ball Bearing Co., 63 Clarissa St., Rochester, N. Y.
Bantam Ball Bearing Co., South Bend, Ind.
Federal Bearings Co., Inc., Poughkeepsie, N. Y.
New Departure Mfg. Co., Bristol, Conn.
S K F Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.

BEARINGS—Brass and Bronze
Bunting Brass & Bronze Co., Toledo, O.
Cramp Brass & Iron Foundries Co., Phila.
Johnson Bronze Co., New Castle, Pa.

BEARINGS—Laminated, Non-Metallic
Synthane Corp., Oaks, Pa.

BEARINGS—Oilless
Rhoades, R. W., Metaline Co., Inc., Long Island City, N. Y.

BEARINGS—Quill Roller
Bantam Ball Bearing Co., South Bend, Ind.

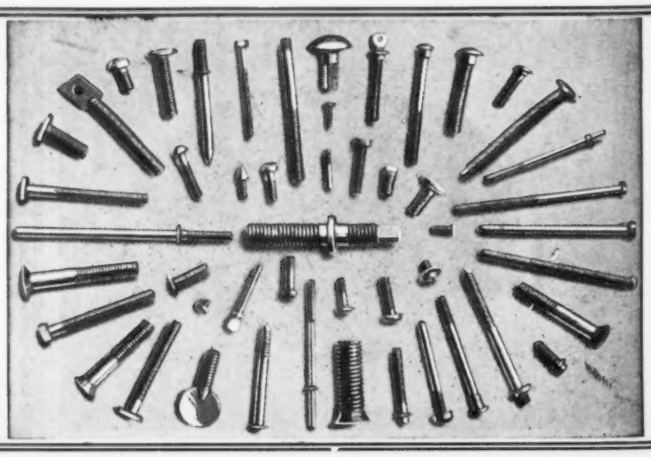
BEARINGS—Radial
Bantam Ball Bearing Co., South Bend, Ind.
S K F Industries, Inc., Front St. & Erie Ave., Phila., Pa.

SPECIAL SCREWS
Made to Order

We manufacture special screws, rivets and studs of quality and precision from all types of material to your specifications.

Our cold heading process will beat the prices on milled-from-the-bar products — and answer your purpose equally well.

We manufacture for the most discriminating users. Our specialists are at your disposal. Why not get in touch with us?

The PROGRESSIVE MFG. CO.
TORRINGTON, CONN., U. S. A.

The illustration indicates a few of the many special parts that we have developed for other manufacturers.